Module Type Controller SRZ

Communication Extension Module

Z-COM

Host Communication

Instruction Manual

RKC INSTRUMENT INC. IMS01T23-E4

- Modbus is a registered trademark of Schneider Electric.
- The name of each programmable controller (PLC) means the products of each manufacturer.
- Company names and product names used in this manual are the trademarks or registered trademarks of the respective companies.

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of the instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference.

SYMBOLS

WARNING : This mark indicates precautions that must be taken if there is danger of electric shock, fire, etc., which could result in loss of life or injury.

CAUTION : This mark indicates that if these precautions and operating procedures are not taken, damage to the instrument may result.

 : This mark indicates that all precautions should be taken for safe usage.

 : This mark indicates important information on installation, handling and operating procedures.

 : This mark indicates supplemental information on installation, handling and operating procedures.

 : This mark indicates where additional information may be located.

⚠ WARNING

- To prevent injury to persons, damage to the instrument and the equipment, a suitable external protection device shall be required.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to the instrument and the equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to the instrument and the equipment.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction may occur and warranty is void under these conditions.

CAUTION

- This product is intended for use with industrial machines, test and measuring equipment. (It is not designed for use with medical equipment and nuclear energy plant.)
- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required to take additional measures.
- This instrument is protected from electric shock by reinforced insulation. Provide reinforced insulation between the wire for the input signal and the wires for instrument power supply, source of power and loads.
- Be sure to provide an appropriate surge control circuit respectively for the following:
  - If input/output or signal lines within the building are longer than 30 meters.
  - If input/output or signal lines leave the building, regardless the length.
- This instrument is designed for installation in an enclosed instrumentation panel. All high-voltage connections such as power supply terminals must be enclosed in the instrumentation panel to avoid electric shock to operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- All wiring must be in accordance with local codes and regulations.
- All wiring must be completed before power is turned on to prevent electric shock, instrument failure, or incorrect action. The power must be turned off before repairing work for input break and output failure including replacement of sensor, contactor or SSR, and all wiring must be completed before power is turned on again.
- To prevent instrument damage as a result of failure, protect the power line and the input/output lines from high currents with a suitable overcurrent protection device with adequate breaking capacity such as a fuse, circuit breaker, etc.
- A malfunction in this product may occasionally make control operations impossible or prevent alarm outputs, resulting in a possible hazard. Take appropriate measures in the end use to prevent hazards in the event of malfunction.
- Prevent metal fragments or lead wire scraps from falling inside instrument case to avoid electric shock, fire or malfunction.
- Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.
- For proper operation of this instrument, provide adequate ventilation for heat dissipation.
- Do not connect wires to unused terminals as this will interfere with proper operation of the instrument.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent such as paint thinner to clean the instrument. Deformation or discoloration may occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to the instrument display, do not rub with an abrasive material or push the front panel with a hard object.
- Do not connect modular connectors to telephone line.

NOTICE

- This manual assumes that the reader has a fundamental knowledge of the principles of electricity, process control, computer technology and communications.
- The figures, diagrams and numeric values used in this manual are only for explanation purpose.
- RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.
- RKC is not responsible for any damage and/or injury resulting from the use of instruments made by imitating this instrument.
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.
- Every effort has been made to ensure accuracy of all information contained herein. RKC makes no warranty, expressed or implied, with respect to the accuracy of the information. The information in this manual is subject to change without prior notice.
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CONTENTS

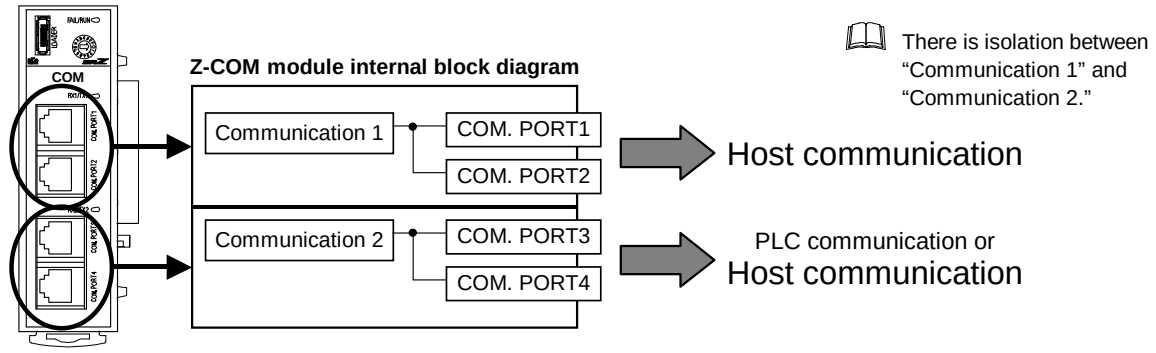
1. OUTLINE

The Z-COM module interfaces with the host computer via Modbus or RKC communication protocols. The communication interface used for both protocols is RS-422A and RS-485.

The following two communication systems of Z-COM module are available.

- Communication 1 (COM. PORT1, COM. PORT2)
- Communication 2 (COM. PORT3, COM.PORT4)

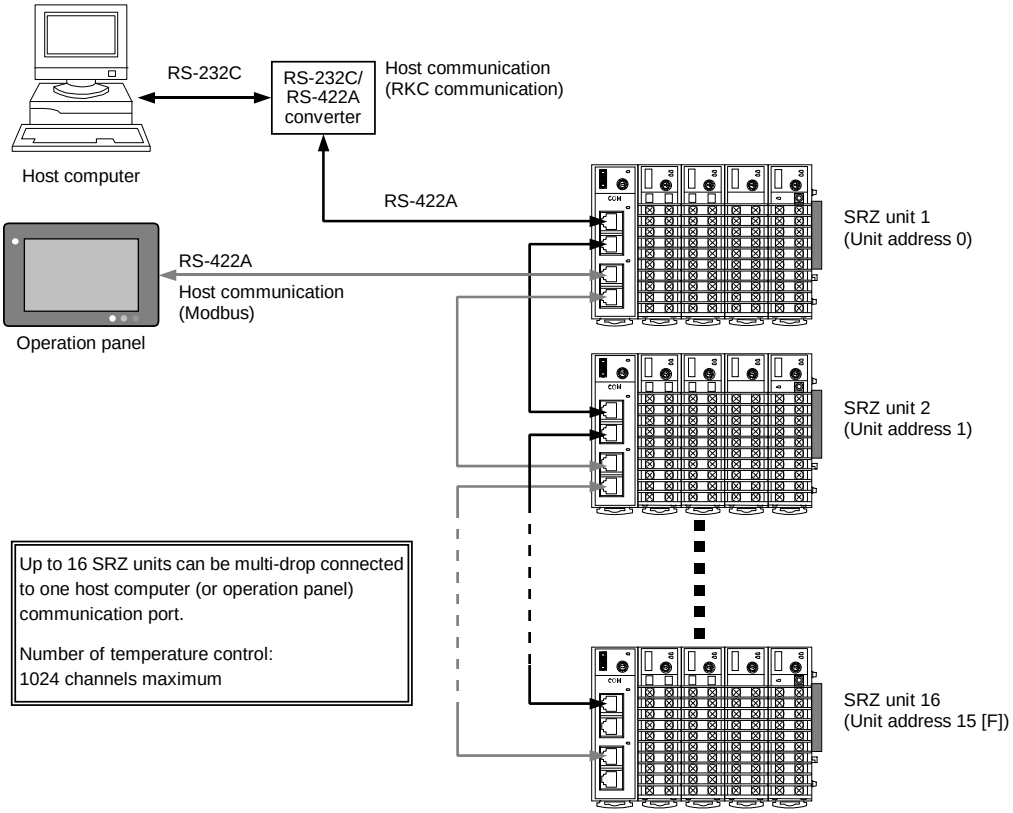
Both communication 1 and communication 2 are available as Host communication.



	COM. PORT	Usage 1	Usage 2
Communication 1	COM. PORT1	Host communication	Host communication
	COM. PORT2		
Communication 2	COM. PORT3	PLC communication	Host communication
	COM. PORT4		

☞ For PLC communication, refer to **Z-COM Instruction Manual (IMS01T22-E□)**.

- Usage example (When both communication 1 and communication 2 are Host communication.)



☞ For configuration of SRZ unit, refer to **Z-COM Instruction Manual (IMS01T22-E□)**.

2. COMMUNICATION SPECIFICATION

■ RKC communication

Interface: Communication 1 (COM. PORT1/2):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard
Communication 2 (COM. PORT3/4):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard

Connection method: RS-422A 4-wire system, half-duplex multi-drop connection
RS-485 2-wire system, half-duplex multi-drop connection

Synchronous method: Start/Stop synchronous type

Communication speed: 4800 bps, 9600 bps, 19200 bps, 38400 bps

Data bit configuration: Start bit: 1
Data bit: 7 or 8
Parity bit: Without, Odd or Even
Stop bit: 1

Protocol: Based on ANSI X3.28-1976 subcategories 2.5 and B1
Polling/Selecting type

Error control: Vertical parity (with parity bit selected)
Horizontal parity (BCC check)

Data types: ASCII 7-bit code

Interval time: 0 to 250 ms

Maximum connections: 16 SRZ units per communication port of host computer
(Up to one Z-COM module can be connected to one SRZ unit)

■ Modbus

Interface:
Communication 1 (COM. PORT1/2):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard
Communication 2 (COM. PORT3/4):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard

Connection method:
RS-422A 4-wire system, half-duplex multi-drop connection
RS-485 2-wire system, half-duplex multi-drop connection

Synchronous method:
Start/Stop synchronous type

Communication speed:
4800 bps, 9600 bps, 19200 bps, 38400 bps

Data bit configuration:
Start bit: 1
Data bit: 8
Parity bit: Without, Odd or Even
Stop bit: 1

Protocol:
Modbus

Signal transmission mode:
Remote Terminal Unit (RTU) mode

Function codes:
03H Read holding registers
06H Preset single register
08H Diagnostics (loopback test)
10H Preset multiple registers

Error check method:
CRC-16

Error codes:
1: Function code error
(An unsupported function code was specified)
2: When the mismatched address is specified.
3: • When the data written exceeds the setting range.
• When the specified number of data items in the query message exceeds the maximum number of data items available
4: Self-diagnostic error response

Interval time:
0 to 250 ms

Maximum connections:
16 SRZ units per communication port of host computer
(Up to one Z-COM module can be connected to one SRZ unit)

3. WIRING

⚠ WARNING

To prevent electric shock or instrument failure, turn off the power before connecting or disconnecting the instrument and peripheral equipment.

CAUTION

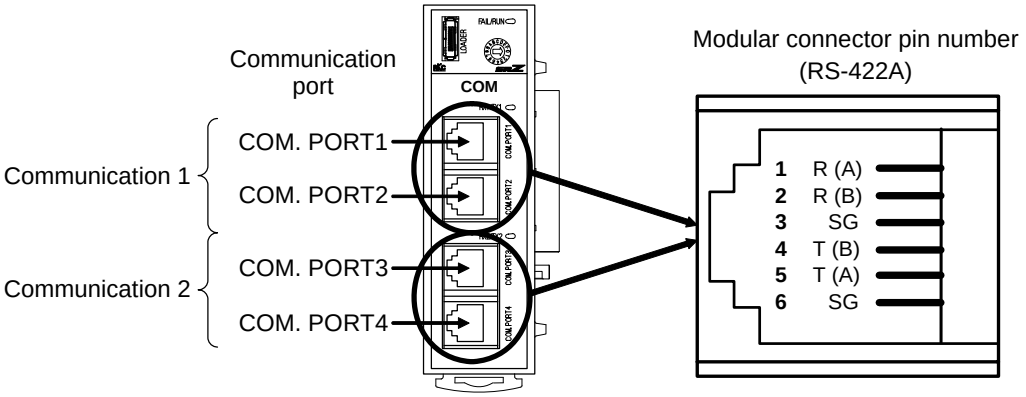
- To avoid noise induction, keep communication signal wire away from instrument power line, load lines and power lines of other electric equipment.
- Connect connectors correctly in the right position. If it is forcibly pushed in with pins in the wrong positions, the pins may be bent resulting in instrument failure.
- When connecting or disconnecting the connectors, do not force it too far to right and left or up and down, but move it on the straight. Otherwise, the connector pins may be bent, causing instrument failure.
- When disconnecting a connector, hold it by the connector itself. Disconnecting connectors by yanking on their cables can cause breakdowns.
- To prevent malfunction, never touch the contact section of a connector with bare hands or with hands soiled with oil or the like.
- To prevent malfunction, connect cable connectors securely, then firmly tighten the connector fastening screws.
- To prevent damage to cables, do not bend cables over with excessive force.
- If the instrument is easily affected by noise, use the ferrite core in the both ends of the communication cable (nearest the connector).

3.1 When Connected with RS-422A

Customer is requested to prepare a communication cable fit for the SRZ unit to be connected by the host computer.

- **Pin layout of modular connector**

The contents of the modular connector signal are all the same from COM. PORT1 to COM. PORT4.

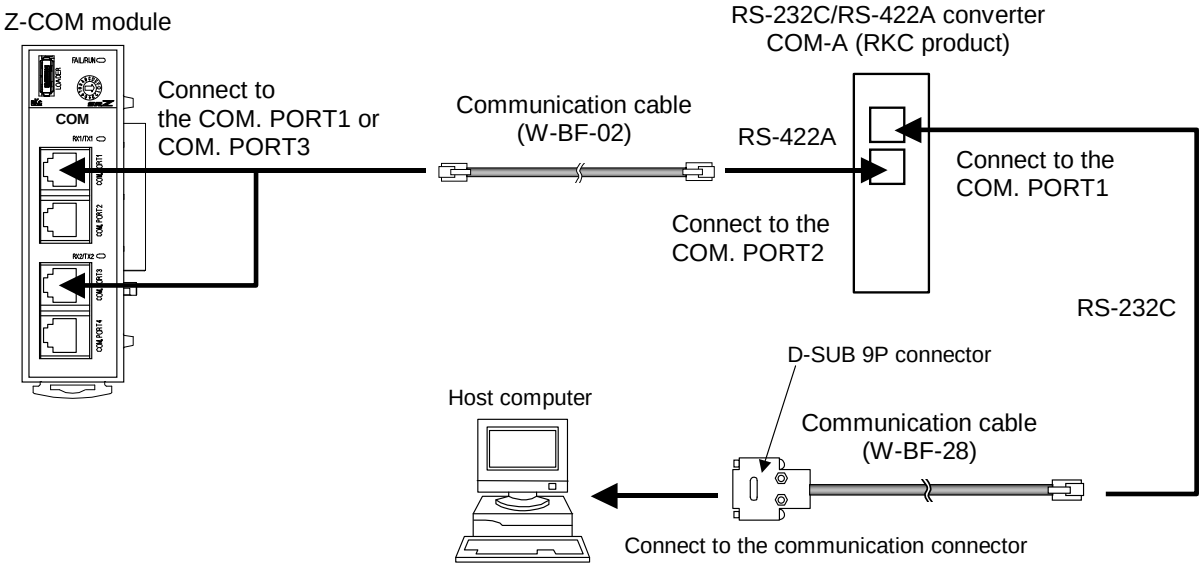


- **Connector pin number and signal details**

Pin No.	Signal name	Symbol
1	Receive data	R (A)
2	Receive data	R (B)
3	Signal ground	SG
4	Send data	T (B)
5	Send data	T (A)
6	Signal ground	SG

The 6-pin type modular connector should be used for the connection to the Z-COM module.
Recommended model: TM4P-66P (Manufactured by HIROSE ELECTRIC CO., LTD.)

■ When the interface of host computer is RS-232C



Cable type: W-BF-02-3000 (RKC product, Sold separately) [Standard cable length: 3 m]
W-BF-28-3000 (RKC product, Sold separately) [Standard cable length: 3 m]

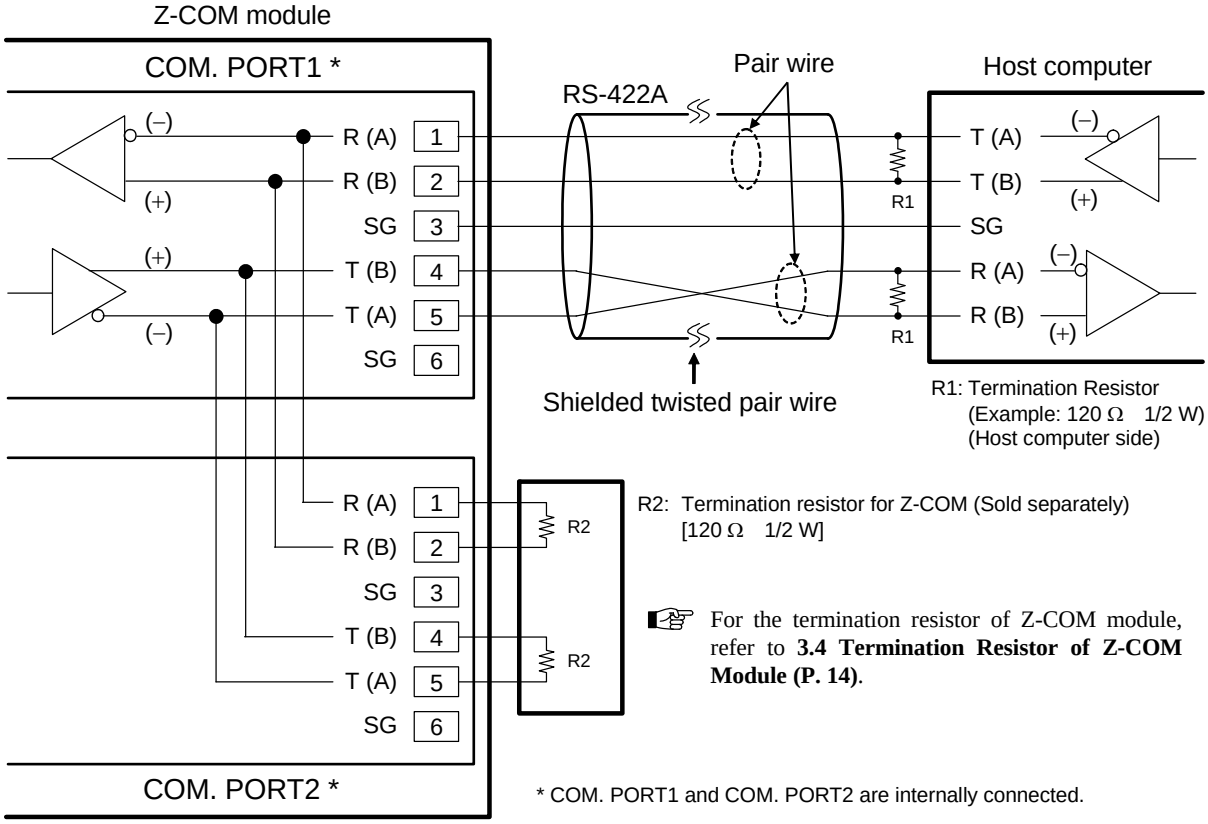
W-BF-02 * or W-BF-28 communication cable (RKC product) can be used as communication cable (sold separately). If noise is a factor, customer should use a twisted pair cable (not included) or something to that effect.

* Shield of the cable are connected to SG (No. 6 pin) of the Z-COM modular connector.

Recommended RS-232C/RS-422A converter: **COM-A** (RKC product)
For the COM-A, refer to **COM-A/COM-B Instruction Manual (IMSRM33-E□)**.

For the termination resistor of Z-COM module, refer to **3.4 Termination Resistor of Z-COM Module (P. 14)**.

■ When the interface of host computer is RS-422A

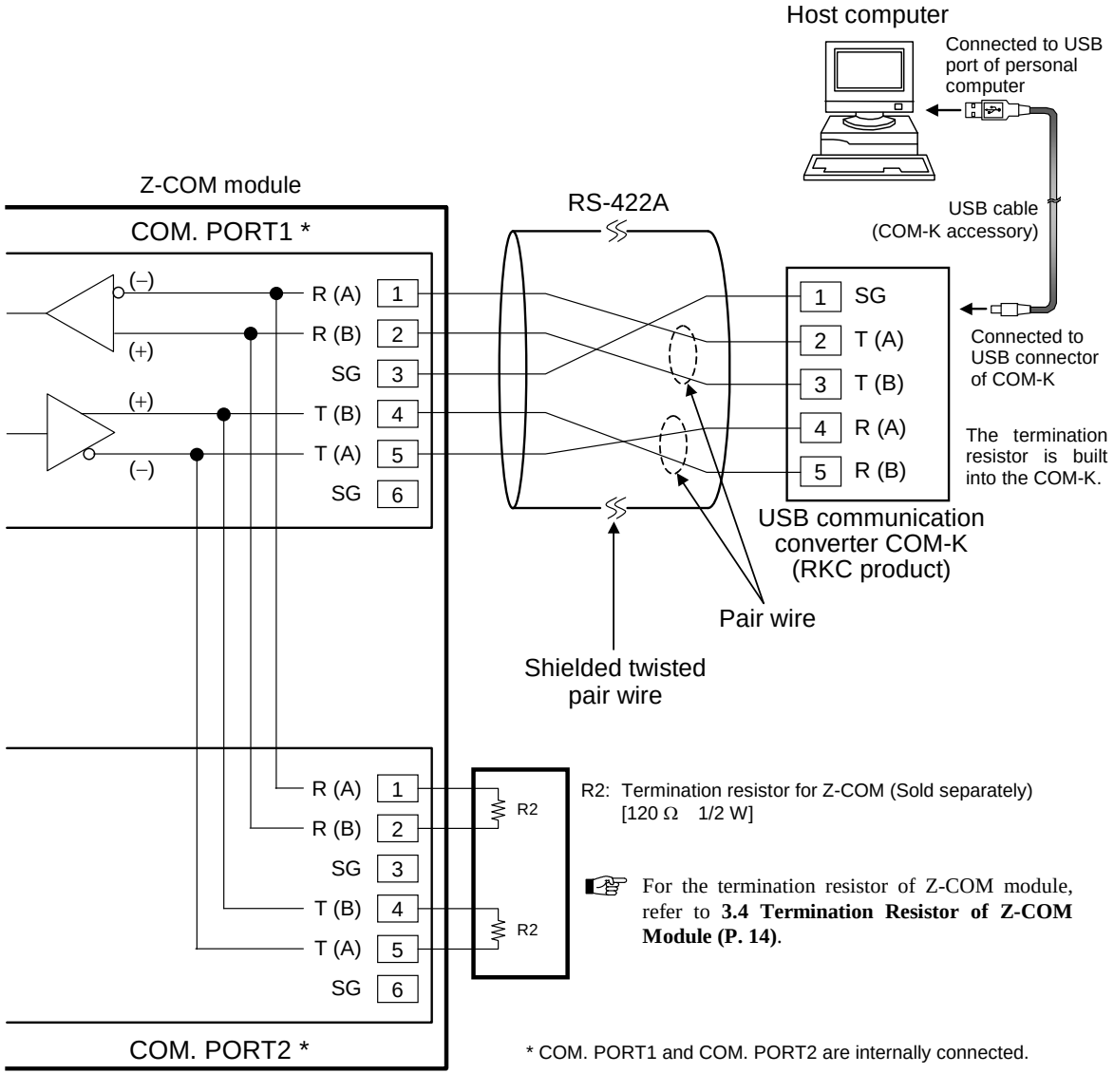


☞ For the termination resistor of Z-COM module, refer to **3.4 Termination Resistor of Z-COM Module (P. 14)**.

📖 The method wiring of COM. PORT3 and COM. PORT4 is the same as a figure above.

■ When the host computer has a USB connector

When the host computer has a USB connector, connect the USB communication converter between the host computer and the Z-COM module.



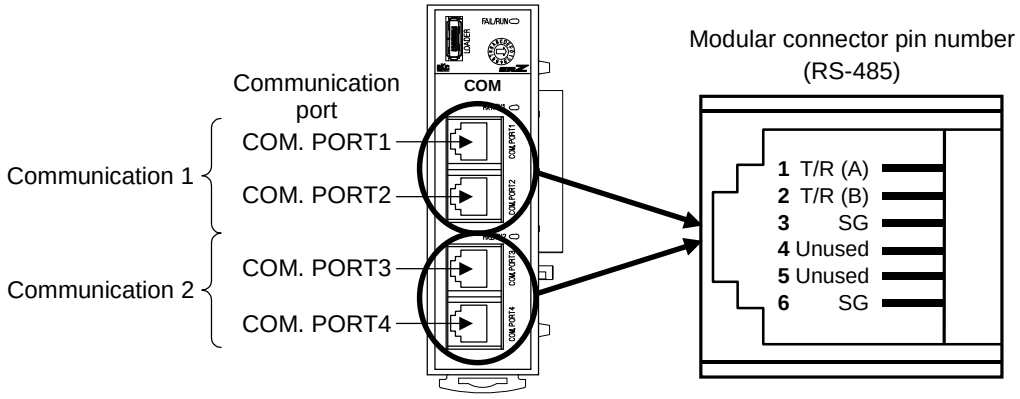
The method wiring of COM. PORT3 and COM. PORT4 is the same as a figure above.

3.2 When Connected with RS-485

Customer is requested to prepare a communication cable fit for the SRZ unit to be connected by the host computer.

- **Pin layout of modular connector**

The contents of the modular connector signal are all the same from COM. PORT1 to COM. PORT4.



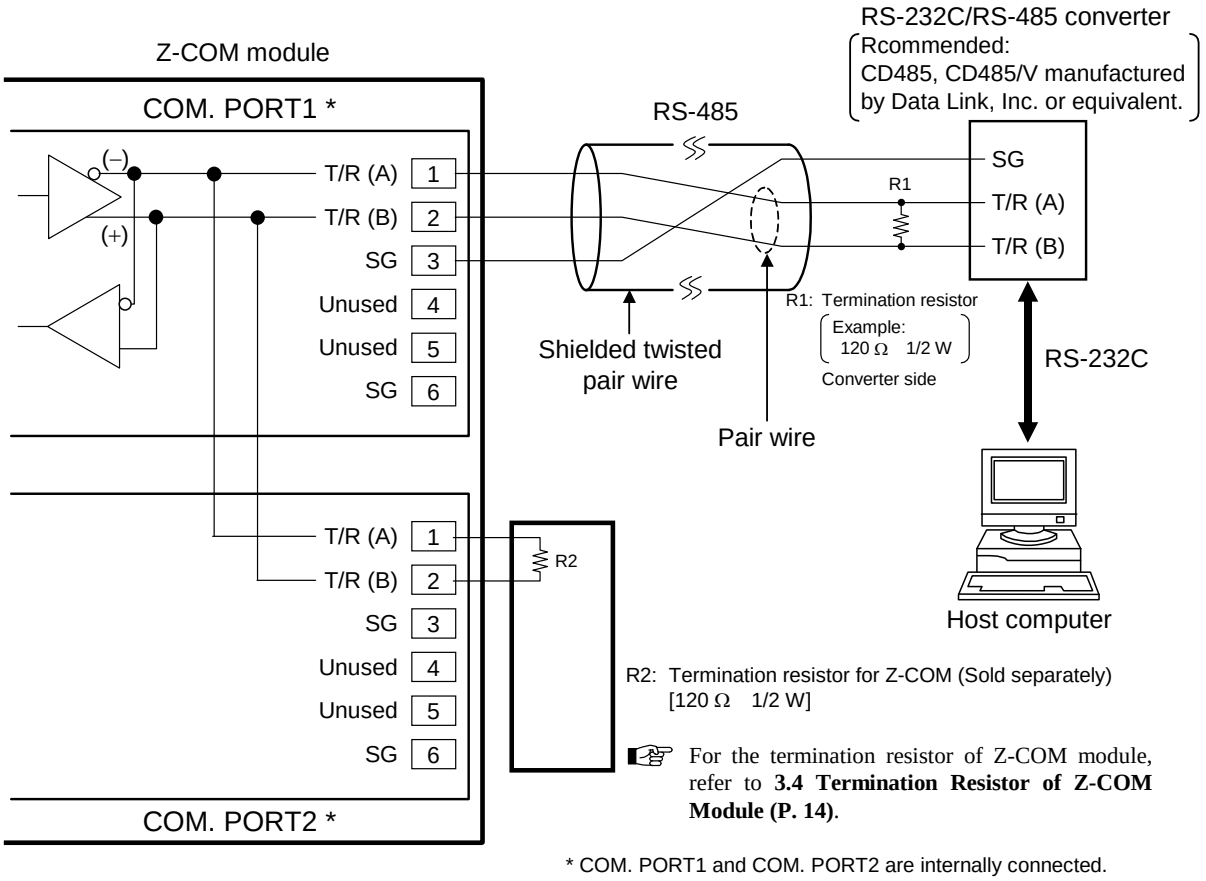
- **Connector pin number and signal details**

Pin No.	Signal name	Symbol
1	Send/Receive data	T/R (A)
2	Send/Receive data	T/R (B)
3	Signal ground	SG
4	Unused	—
5	Unused	—
6	Signal ground	SG

The 6-pin type modular connector should be used for the connection to the Z-COM module.
Recommended model: TM4P-66P (Manufactured by HIROSE ELECTRIC CO., LTD.)

■ When the interface of host computer is RS-232C

Use a RS-232C/RS-485 converter with an automatic send/receive transfer function.



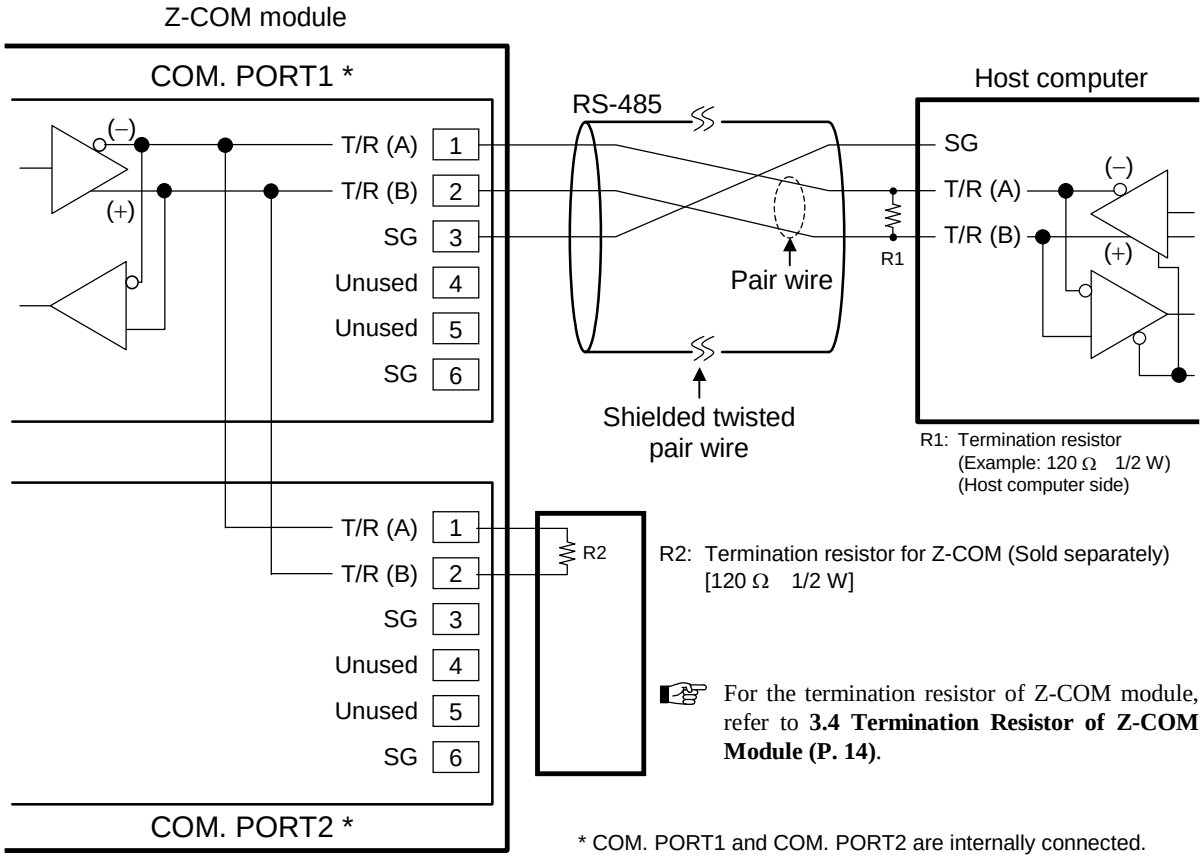
R2: Termination resistor for Z-COM (Sold separately)
[120 Ω 1/2 W]

☞ For the termination resistor of Z-COM module, refer to **3.4 Termination Resistor of Z-COM Module (P. 14)**.

* COM. PORT1 and COM. PORT2 are internally connected.

📖 The method wiring of COM.PORT3 and COM.PORT4 is the same as a figure above.

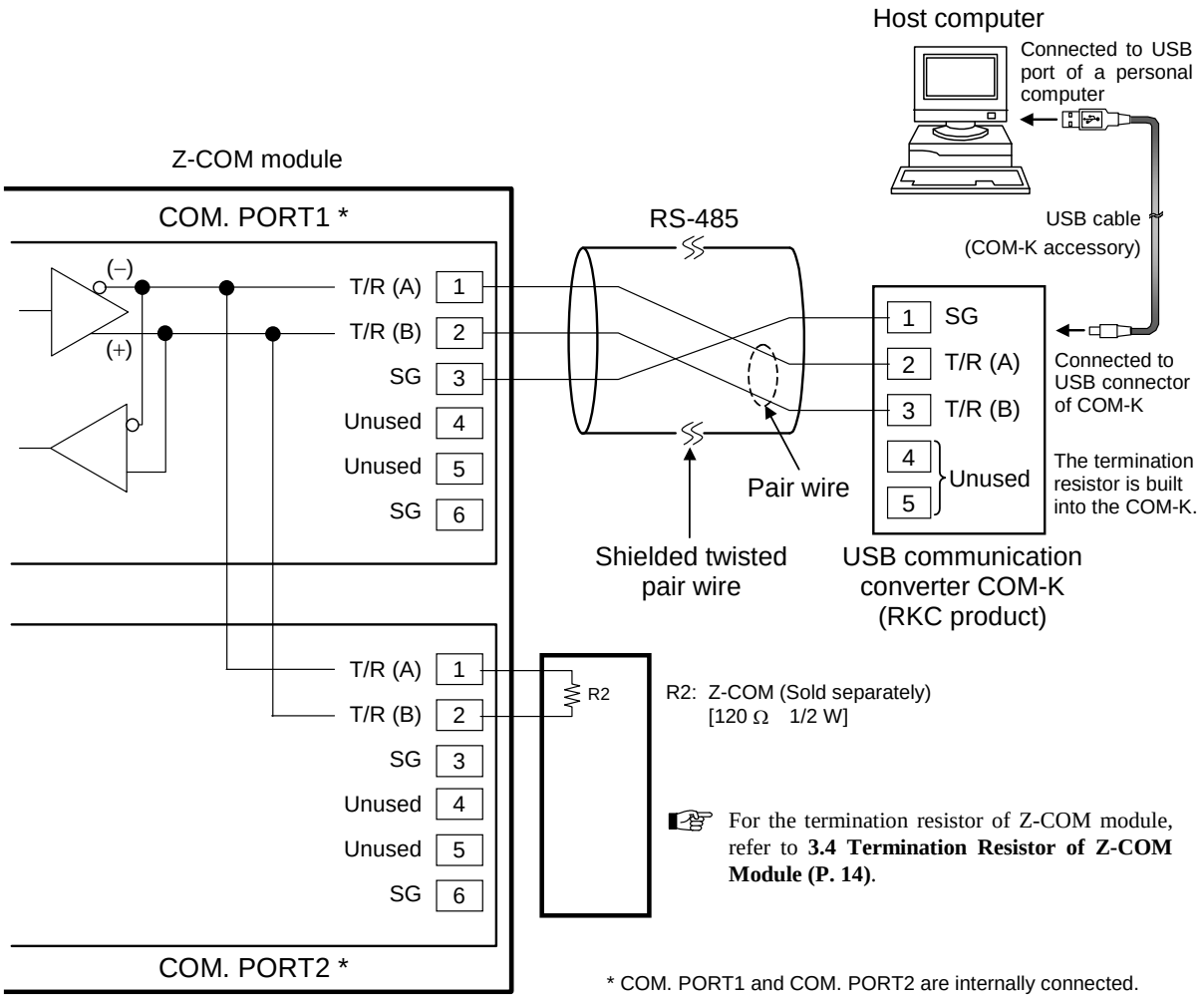
■ When the interface of host computer is RS-485



☞ For the termination resistor of Z-COM module, refer to **3.4 Termination Resistor of Z-COM Module (P. 14)**.

📖 The method wiring of COM. PORT3 and COM. PORT4 is the same as a figure above.

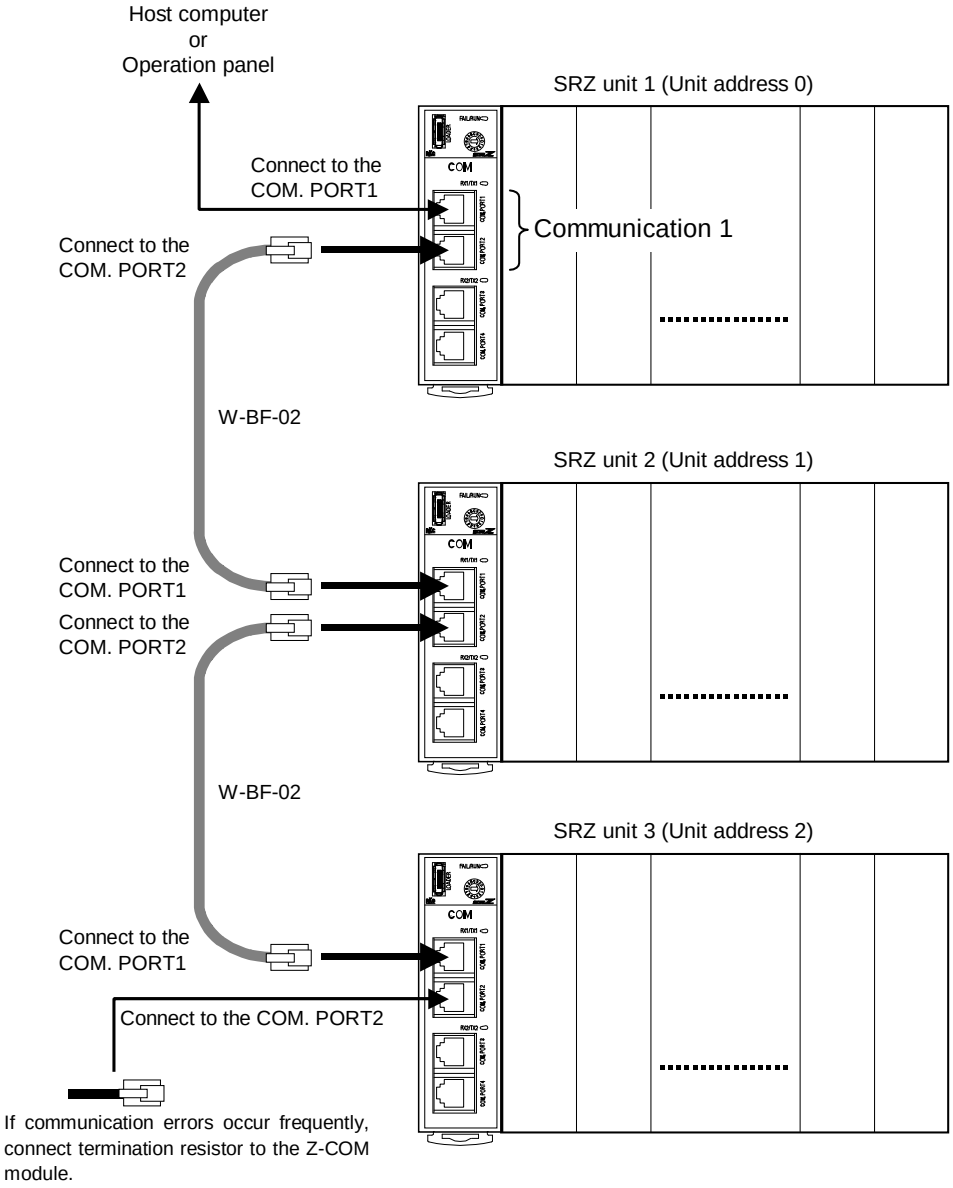
■ When the host computer has a USB connector



☞ For the termination resistor of Z-COM module, refer to **3.4 Termination Resistor of Z-COM Module (P. 14)**.

3.3 Multiple SRZ Unit Connections

[Example: When two or more SRZ units are connected to the communication 1]



For RS-422A interface, order W-BF-02 connection cable (sold separately) to connect the SRZ unit. If noise is a factor, customer should use a twisted pair cable (not included) or something to that effect.
Cable type: W-BF-02-3000 (Sold separately) [Standard cable length: 3 m]

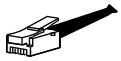
COM. PORT1 and COM. PORT2 are internally connected.

This description also applies even when the communication 2 is connected.

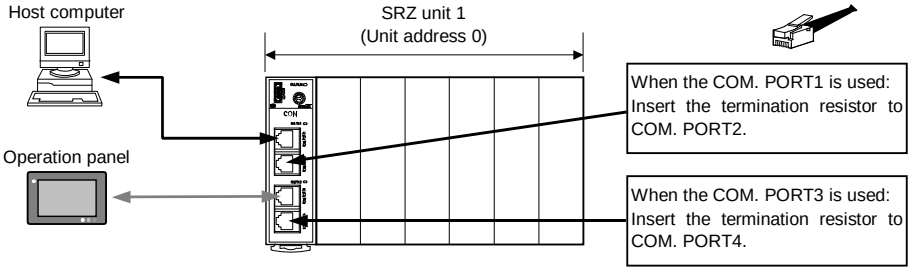
For the termination resistor of Z-COM module, refer to **3.4 Termination Resistor of Z-COM Module (P. 14)**.

3.4 Termination Resistor of Z-COM Module

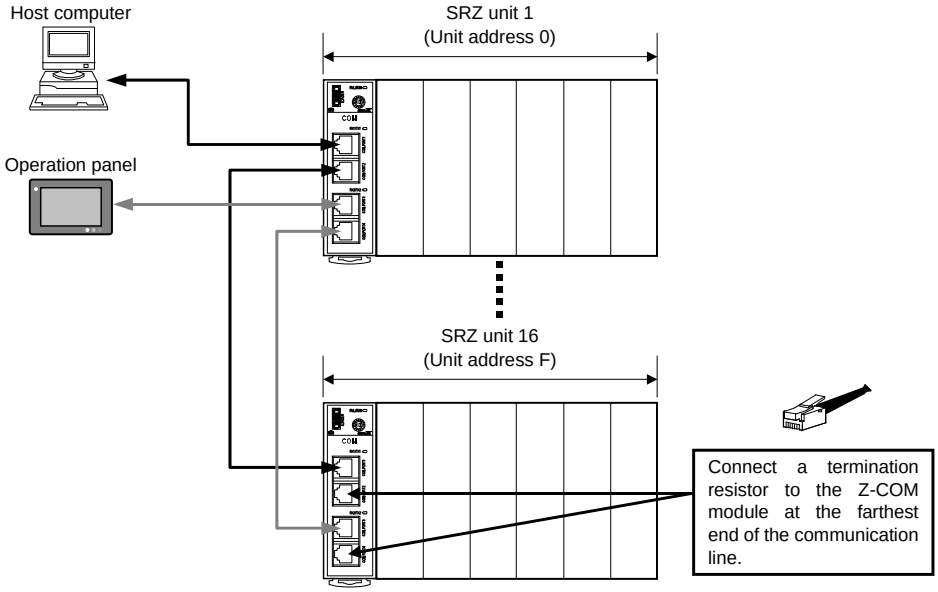
If communication errors occur frequently due to the operation environment or the communication distance, connect termination resistors to the Z-COM module and the other party unit. For the termination resistor of the Z-COM module, connect a Z-COM termination resistor connector (sold separately).

Termination resistor for Z-COM (Sold separately):	W-BW-01 (for RS-485)	[120 Ω 1/2 W]	
	W-BW-02 (for RS-422A)	[120 Ω 1/2 W]	

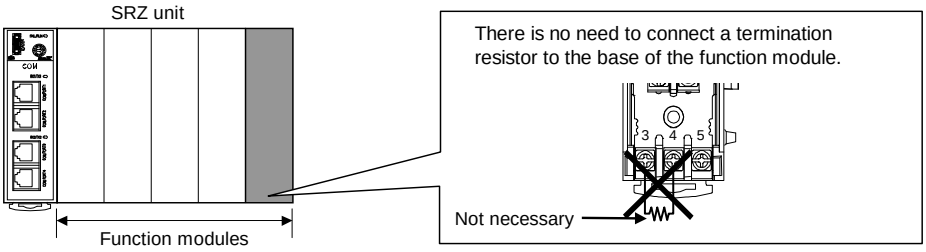
For the termination resistor of the other party unit, refer to the other party unit Instruction Manual.



When two or more SRZ units are connected, connect a termination resistor to the Z-COM module at the farthest end of the communication line.



Termination resistor of the function modules (Z-TIO, Z-DIO and Z-CT modules):
When using a Z-COM module joined together with function modules, there is no need to connect a termination resistor to the function modules.

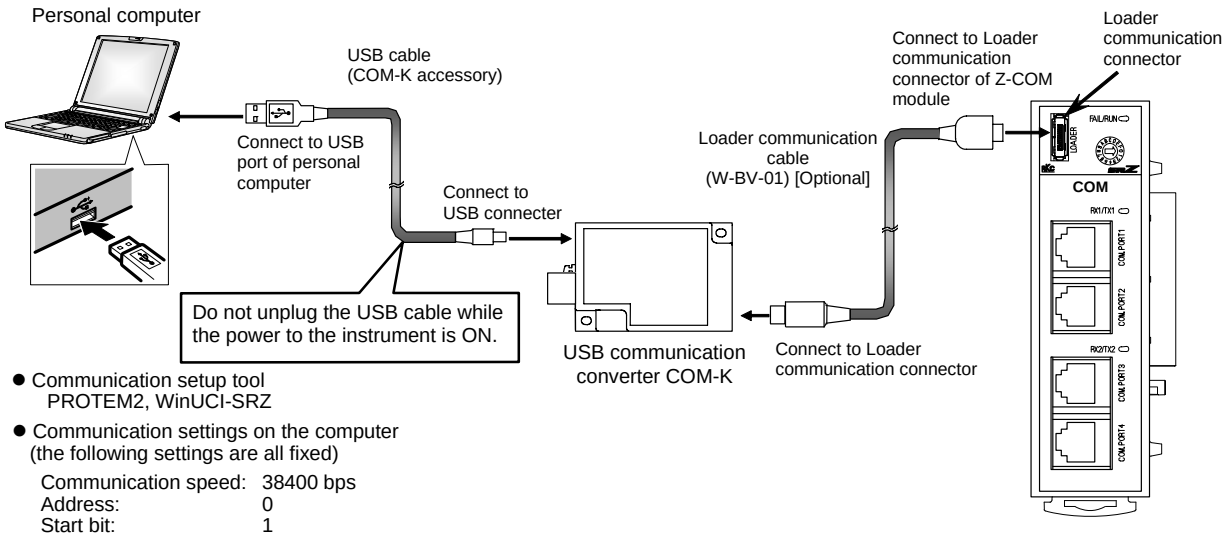


3.5 Connections for Loader Communication

Z-COM module is equipped standard with a Loader communication connector.
The module Loader communication connector, our COM-K USB communication converter (sold separately)*, and a personal computer can be connected with the appropriate cables, and our communication tool (PROTEM2, WinUCI-SRZ) can be installed on the computer, to enable data management monitoring and settings from the computer.

The communication tool (PROTEM2, WinUCI-SRZ) can be downloaded from the official RKC website:
http://www.rkcinst.com/.

* A Loader communication cable (optional) is required for the connection to the Loader communication connector on the Z-COM module.
  USB communication converter COM-K-1 (with Loader communication cable [cable length: 1 m])



- Communication setup tool
  PROTEM2, WinUCI-SRZ
- Communication settings on the computer
  (the following settings are all fixed)

Communication speed:	38400 bps
Address:	0
Start bit:	1
Data bit:	8
Parity bit:	Without
Stop bit:	1

The Loader port is only for parameter setup.

Normally only the data of the module to which the Loader communication cable is connected can be sent using Loader communication; however, when the cable is connected to a Z-COM module, the data of function modules connected to the Z-COM module can also be sent.

The module address for Loader communication is fixed at "0." The setting of the address setting switch is disregarded.

Loader communication corresponds to RKC communication (based on ANSI X3.28-1976 subcategories 2.5 and B1).

For the COM-K, refer to the **COM-K Instruction Manual (IMR01Z01-E□).**

4. COMMUNICATION SETTING

⚠ WARNING

- To prevent electric shock or instrument failure, always turn off the power before setting the switch.
- To prevent electric shock or instrument failure, never touch any section other than those instructed in this manual.

CAUTION

Do not separate the module mainframe from the base with the power turned on. If so, instrument failure may result.

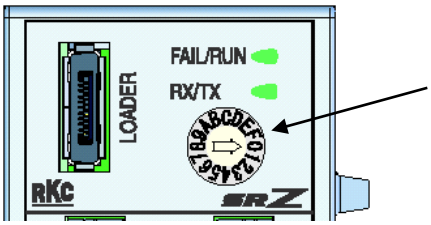
☞ For communication setting, refer to the **Z-COM Instruction Manual (IMS01T22-E□)**.

4.1 Communication Setting of Z-COM Module

4.1.1 Address setting

When SRZ units are multi-drop connected, set an address to each Z-COM module.
Set an address for the SRZ unit (address for Z-COM module) using a small blade screwdriver.

To avoid problems or malfunction, do not duplicate an address on the same communication line.



Address setting switch
Setting range: 0 to F (0 to 15: Decimal number)
Factory set value: 0

■ Address setting for Host communication (RKC communication or Modbus)

Differently from PLC communication, there are no group restrictions. Free settings can be made in the range of 0 to F.

For Modbus, the value obtained by adding "1" to the set address corresponds to the address used for the actual program.

■ Address setting for Loader communication

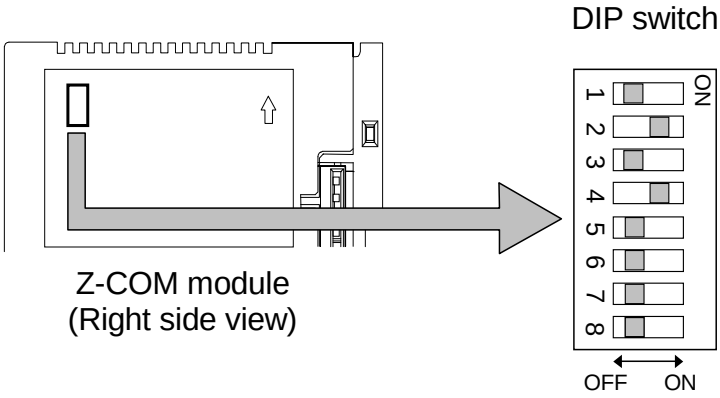
When Loader communication is performed, the host computer and SRZ unit communicate on a one-to-one basis, and thus the unit address is fixed at "0." Because the address is fixed in "0" inside the Z-COM module, the setting of the address setting switch is disregarded.

The Loader port is only for parameter setup.

4.1.2 Communication speed and Communication protocol setting by DIP switch

Use the DIP switch on the right side of Z-COM module to select Communication speed, Data bit, configuration and protocol. The data change become valid the power of the Z-COM module is turned on again or when control is switched from STOP to RUN.

When the SRZ units are multi-drop connected, set the DIP switches in all of the Z-COM modules to the same positions.



1	2	Communication speed (Communication 1)
OFF	OFF	4800 bps
ON	OFF	9600 bps
OFF	ON	19200 bps (Factory set value)
ON	ON	38400 bps

3	Communication protocol and Data bit configuration [1] (Communication 1)
OFF	Host communication (RKC communication) Data 8-bit, without parity, Stop 1-bit (Factory set value [2])
ON	Host communication (Modbus) Data 8-bit, without parity, Stop 1-bit

[1] The Data bit configuration other than the above can be changed by the Host communication or Loader communication.

[2] Factory set values when the Communication protocol is not specified at the factory.

4	Communication speed (Communication 2) *
OFF	9600 bps
ON	19200 bps (Factory set value)

* When the Communication speed of communication 2 is changed to “4800 bps” or “38400 bps,” it can be changed by the Host communication or Loader communication.

Continued on the next page.

Continued from the previous page.

5	6	7	Communication protocol and Data bit configuration [1] (Communication 2)
OFF	OFF	OFF	Host communication (RKC communication) Data 8-bit, without parity, Stop 1-bit (Factory set value [2])
ON	OFF	OFF	Host communication (Modbus) Data 8-bit, without parity, Stop 1-bit
OFF	ON	OFF	PLC communication MITSUBISHI MELSEC series special protocol • A-compatible 1C frame (format 4), AnA/AnUCPU common command (QR/QW) [AnA, AnU, QnA, Q, FX3U or FX3UC series] • QnA-compatible 3C frame (format 4), command (0401/1401) The available register is only a ZR register. [QnA or Q series] Data 7-bit, without parity, Stop 1-bit
ON	ON	OFF	PLC communication OMRON SYSMAC series special protocol C mode command (RD/WD, RE/WE) Data 7-bit, Even parity, Stop 2-bit
OFF	OFF	ON	PLC communication MITSUBISHI MELSEC series special protocol A-compatible 1C frame (format 4), ACPU common command (WR/WW) [A, FX2N, FX2NC, FX3U or FX3UC series] Data 7-bit, without parity, Stop 1-bit
ON	OFF	ON	PLC communication YOKOGAWA FA-M3R special protocol Data 8-bit, without parity, Stop 1-bit
OFF	ON	ON	**Do not set this one**
ON	ON	ON	

[1] The Data bit configuration other than the above can be changed by the Host communication or Loader communication.
[2] Factory set values when the Communication protocol is not specified at the factory.

8	DIP switch setting validate/invalidate
OFF	Validate (Factory set value)
ON	Invalidate (According to the settings in Host communication or Loader communication)

The first time that DIP switch No. 8 is switched off (invalidate), the following communication data will be factory set values.

- Communication 1 communication speed
- Communication 1 protocol
- Communication 1 data bit configuration
- Communication 2 communication speed
- Communication 2 protocol
- Communication 2 data bit configuration

For Host communication, refer to **4.1.3 Communication speed and Communication protocol setting via Host communication (P. 19)**.
For Loader communication, refer to **4.1.4 Communication setting for Loader communication (P. 21)**.

4.1.3 Communication speed and Communication protocol setting via Host communication

Settings for the SRZ unit Communication speed, Communication protocol, and Data bit configuration can also be configured by Host communication. When Host communication is used, Communication speed and Data bit configuration settings that cannot be set using the DIP switches can be configured.
To change the set values indicated below by Host communication, host computer and SRZ unit communication must first be enabled in the DIP switch communication settings.

The communication data below will not take effect until the power is restarted or control is switched from STOP to RUN.

Name	RKC Identifier	Digits	Modbus register address		Attribute	Structure*	Data range	Factory set value
			HEX	DEC				
Communication 1 protocol	VK	1	8000	32768	R/W	U	0: RKC communication 1: Modbus	0
Communication 1 communication speed	VL	1	8001	32769	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
Communication 1 data bit configuration	VM	7	8002	32770	R/W	U	0 to 5 Refer to Table 1: Data bit configuration.	0
Communication 2 protocol	VP	1	8004	32772	R/W	U	0: RKC communication 1: Modbus 2: MITSUBISHI MELSEC series special protocol • A-compatible 1C frame (format 4) AnA/AnUCPU common command (QR/QW) [AnA, AnU, QnA, Q, FX3U or FX3UC series] • QnA-compatible 3C frame (format 4) command (0401/1401) The available register is only a ZR register. [QnA or Q series] 3: OMRON SYSMAC series special protocol 4: MITSUBISHI MELSEC series special protocol A-compatible 1C frame (format 4) ACPU common command (WR/WW) [A, FX2N, FX2NC, FX3U or FX3UC series] 5: YOKOGAWA FA-M3R special protocol	0
Communication 2 communication speed	VU	1	8005	32773	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
Communication 2 data bit configuration	VW	7	8006	32774	R/W	U	0 to 11 Refer to Table 1: Data bit configuration.	0

* U: Data for each SRZ unit

Table 1: Data bit configuration

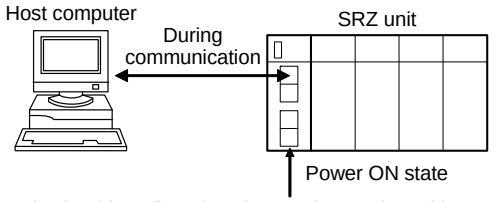
Set value	Data bit	Parity bit	Stop bit	Settable communication
0	8	Without	1	Modbus RKC communication PLC communication
1	8	Even	1	
2	8	Odd	1	
3	7	Without	1	RKC communication PLC communication
4	7	Even	1	
5	7	Odd	1	

Set value	Data bit	Parity bit	Stop bit	Settable communication
6	8	Without	2	PLC communication
7	8	Even	2	
8	8	Odd	2	
9	7	Without	2	
10	7	Even	2	
11	7	Odd	2	

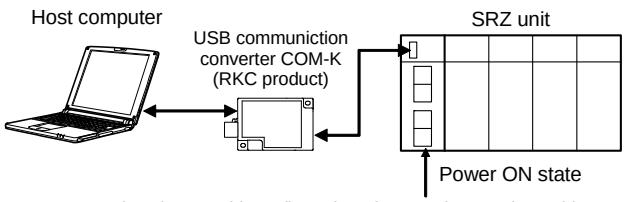
■ Setting example

When changing the Data bit configuration of communication 1 for SRZ unit:
(Change the Data bit configuration from “data 8-bit, no parity, stop 1-bit” to “data 8-bit, even parity, stop 1-bit.”)

1. Change the data bit configuration of SRZ unit on the host computer.
Change to “1: data 8-bit, even parity, stop 1-bit.”



Setting that uses “communication 1” port



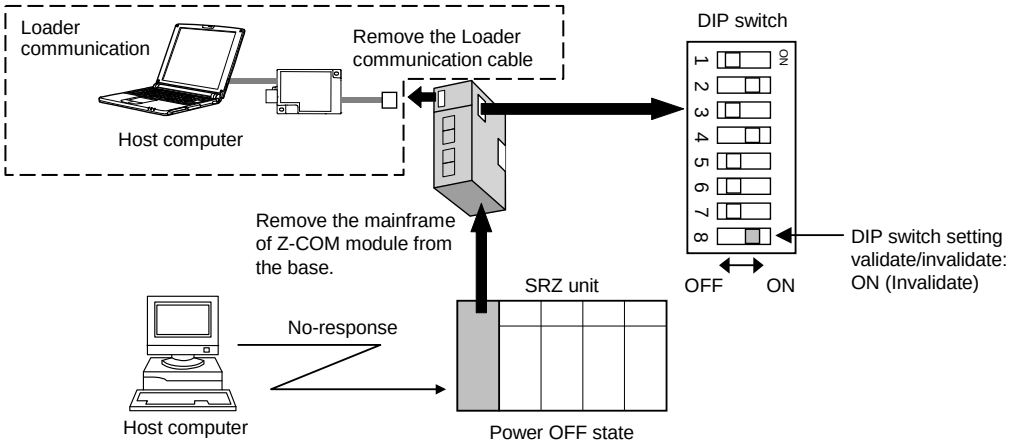
Setting by Loader communication

2. Turn off the power supply of SRZ unit.

3. Change the Data bit configuration of the host computer. Change to “1: data 8-bit, even parity, stop 1-bit.”

- Data bit configuration can be rewritten at the “Comm. Port” setting when using PROTEM2, communication tool.
- Data bit configuration can be rewritten at the Communication parameter display when using WinUCI-SRZ, communication setup tool.

4. Remove the mainframe of Z-COM module from the base. Then, set the DIP switch No.8 to “ON (Invalidate).” When Loader communication is performed, take off the cable of the Loader communication from a Z-COM module.



The first time that DIP switch No. 8 is switched off (invalidate), the following communication data will be factory set values. In addition to the communication data that is to be changed, there may be other settings that must be configured.

- Communication 1 communication speed
- Communication 1 protocol
- Communication 1 data bit configuration
- Communication 2 communication speed
- Communication 2 protocol
- Communication 2 data bit configuration

5. Mount the mainframe of Z-COM module on the base. Turn on the power supply of SRZ unit.
If the power is turned on, communication starts at the changed value.

4.1.4 Communication setting for Loader communication

When Loader communication is used, the Communication speed, Communication protocol, and Data bit configuration of the Z-COM module are fixed. There is no need to configure the communication settings of the Z-COM module.
Set the communication settings of the host computer to the same settings as the Z-COM module.

Address, Communication speed, Communication protocol, and Data bit configuration for loader communication

Name	Data (fixed value)
Address (SRZ unit address)	0
Communication speed	38400 bps
Communication protocol	RKC communication Based on ANSI X3.28-1976 subcategories 2.5 and B1
Data bit configuration	Data bit: 8 Parity bit: Without Stop bit: 1

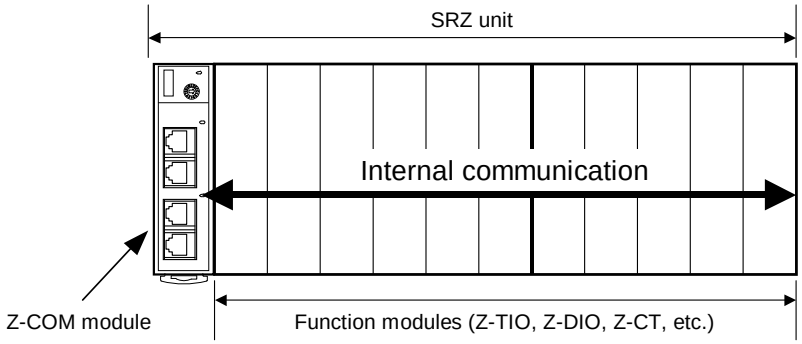
The communication settings are the same as for Host communication.

☞ For setting details, refer to **4.1.3 Communication speed and Communication protocol setting via Host communication (P. 19)**.

- Communication speed can be rewritten when using PROTEM2, communication tool.
- Communication speed can be rewritten at the Communication parameter display when using WinUCI-SRZ, communication setup tool.

4.2 Communication Setting of the Function Modules

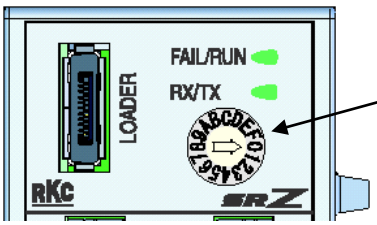
Only make the module address setting to make the function module (Z-TIO, Z-DIO and Z-CT modules) communication settings. The SRZ unit performs internal communication between the Z-COM module and the function module, so the Communication protocol, Communication speed, and Data bit configuration do not need to be set.



4.2.1 Address setting of the function modules

Set the address of the function modules. When using two or more function modules, set the desired module address to each module. For this setting, use a small blade screwdriver.

To avoid problems or malfunction, do not duplicate a module address on the same communication line.

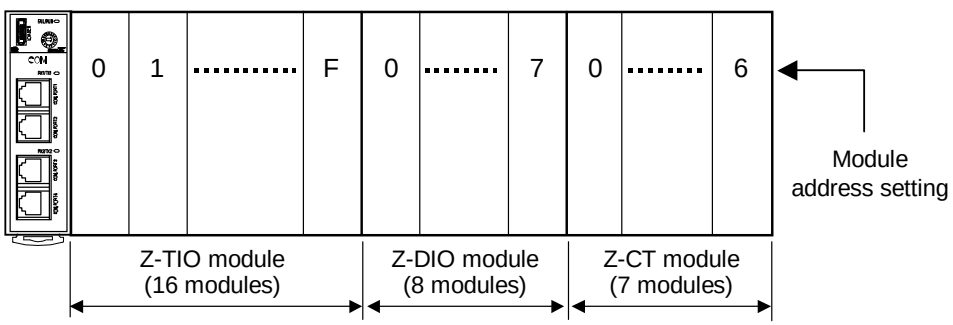


Address setting switch
Setting range: 0 to F
(0 to 15: Decimal number)
Factory set value: 0

The maximum number of function modules (Z-TIO, Z-DIO and Z-CT modules) described in the following can be joined per Z-COM module.

- When joining function modules of the same type: Up to 16 modules
- When joining function modules of two or more different types: Up to 31 modules
  (However, the maximum joinable number of function modules of the same type is 16.)

Address setting example of function module (16 Z-TIO module, 8 Z-DIO module, 7 Z-CT module):



4.2.2 Channel of the SRZ unit

■ Temperature control channel of Z-TIO module

Setting the Z-TIO module address determines the temperature control channel number used for communication. To each Z-TIO module address, the relevant temperature control channel is assigned. Each temperature control channel number can be calculated from the following equation.

Temperature control channel number of communication =
[Module address setting [a]] × [Maximum channel number of the function module [b]]
+ [Channel number in a module]

[a] When the setting is A to F, it is a decimal number.
[b] For the Z-TIO module, it is calculated by "4."

■ Digital input/output channel of Z-DIO module

Setting the Z-DIO module address determines the digital input/output channel number of SRZ unit. To each Z-DIO module address, the relevant digital input/output channel is assigned. Each digital input/output channel can be calculated from the following equation.

Digital input/output channel number =
[Module address setting [a]] × [Maximum channel number of the function module [b]]
+ [Input (or output) channel number in a module]

[a] When the setting is A to F, it is a decimal number.
[b] For the Z-DIO module, it is calculated by "8."

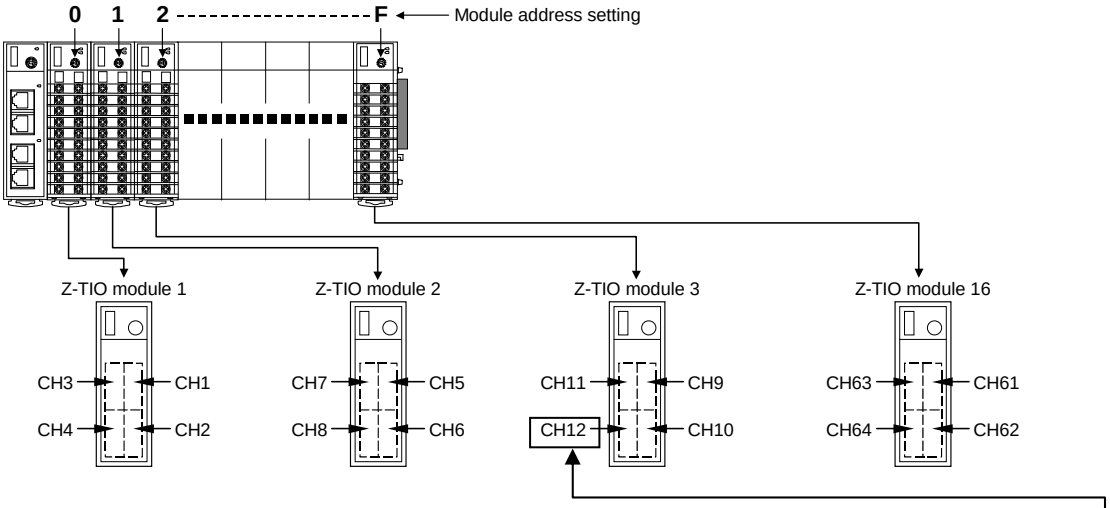
■ Current transformer (CT) input channel of Z-CT module

Setting the Z-CT module address determines the current transformer (CT) input channel number of SRZ unit. To each Z-CT module address, the relevant current transformer (CT) input channel is assigned. Each current transformer (CT) input channel can be calculated from the following equation.

Current transformer (CT) input channel number =
[Module address setting [a]] × [Maximum channel number of the function module [b]]
+ [Channel number in a module]

[a] When the setting is A to F, it is a decimal number.
[b] For the Z-CT module, it is calculated by "12."

Example: When 16 Z-TIO modules (4-channel type) are joined



- Z-TIO module 3: The temperature control channel number used for communication of channel 4
  $2 \times 4 + 4 = 12$

5. COMMUNICATION REQUIREMENTS

Caution for communication is shown in the following.

■ Processing times during data send/receive

When the host computer is using either the polling or selecting procedure for communication, the following processing times are required for SRZ unit to send data:
- Response wait time after SRZ unit sends BCC in polling procedure
- Response wait time after SRZ unit sends ACK or NAK in selecting procedure

RKC communication (Polling procedure)

Procedure details	Time
Response send time after controller receives ENQ	60 ms max.
Response send time after controller receives ACK	60 ms max.
Response send time after controller receives NAK	60 ms max.
Response send time after controller sends BCC	2 ms max.

RKC communication (Selecting procedure)

Procedure details	Time
Response send time after controller receives BCC	60 ms max. [1, 2]
Response wait time after controller sends ACK	2 ms max.
Response wait time after controller sends NAK	2 ms max.

Modbus

Procedure details	Time
Read holding registers [03H] Response send time after the slave receives the query message	60 ms max.
Preset single register [06H] Response send time after the slave receives the query message	100 ms max.
Diagnostics (loopback test) [08H] Response send time after the slave receives the query message	30 ms max.
Preset multiple registers [10H] Response send time after the slave receives the query message	100 ms max. [2]

[1] When selecting is performed for 128 or more channels on a Z-CT module, the maximum time is 90 ms.

[2] In the case of RKC communication (selecting procedure), the time will be "the time after BCC reception until an acknowledgement [ACK] is sent."
- When successive changes are made to the setting of the same item
  [Example] Successive changes to a Set value (SV), control by manual manipulated output value, etc.
- When successive changes are made to multiple items
  [Example] Configuring initial settings

Processing times (Varies with the function module types.)

Function module (When connected maximum connection number)	Time
Setting items of the Z-TIO module	750 ms max.
Setting items of the Z-DIO module	2000 ms max.
Setting items of the Z-CT module	5000 ms max.

■ Caution for selecting

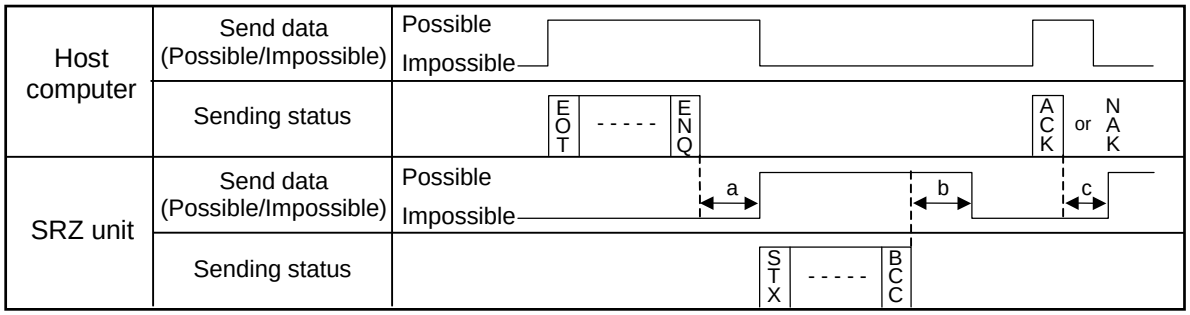
When selecting of the following communication data of a Z-TIO module is performed, the next selecting procedure for the changed Z-TIO module will not be possible for 4 to 6 seconds.
For this reason, when there are many channels to be changed, do not perform selecting for each channel individually; perform selecting for all channels at once. Note that if the communication data exceeds 129 bytes, the data will be separated into blocks by ETB.

- Input type
- Decimal point position
- Integral/Derivative time decimal point position

■ RS-485 (2-wire system) send/receive timing

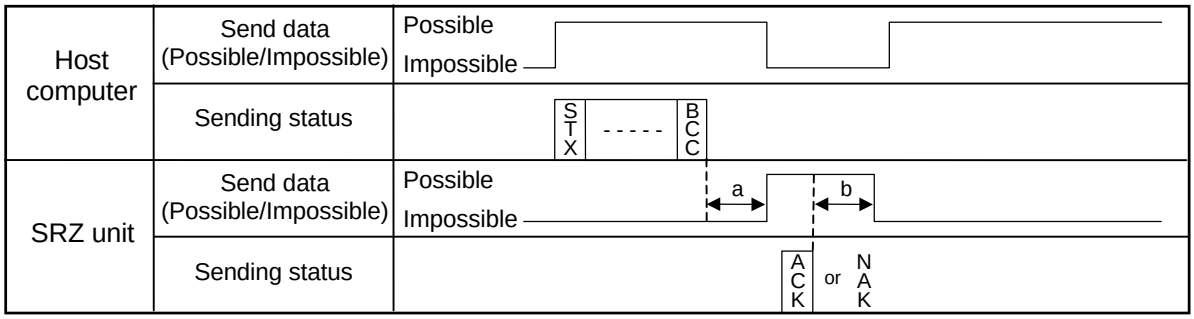
RS-485 communication is conducted through two wires, therefore the transmission and reception of data requires precise timing.

● Polling procedure



a: Response send time after the controller receives [ENQ] + Interval time
b: Response send time after the controller sends BCC
c: Response send time after the controller receives [ACK] + Interval time or
Response send time after the controller receives [NAK] + Interval time

● Selecting procedure



a: Response send time after the controller receives BCC + Interval time
b: Response wait time after the controller sends ACK or Response wait time after the controller sends NAK

To switch the host computer from transmission to reception, send data must be on line.

The following processing times are requires for the SRZ unit to process data.
- In Polling procedure, Response wait time after the SRZ unit sends BCC
- In Selecting procedure, Response wait time after the SRZ unit sends ACK or NAK

■ Fail-safe

A transmission error may occur with the transmission line disconnected, shorted or set to the high-impedance state. In order to prevent the above error, it is recommended that the fail-safe function be provided on the receiver side of the host computer. The fail-safe function can prevent a framing error from its occurrence by making the receiver output stable to the MARK (1) when the transmission line is in the high-impedance state.

6. RKC COMMUNICATION

RKC communication uses the Polling/Selecting method to establish a data link. The basic procedure is followed ANSI X3.28-1976 subcategories 2.5 and B1 basic mode data transmission control procedure (Fast selecting is the selecting method used in SRZ unit).

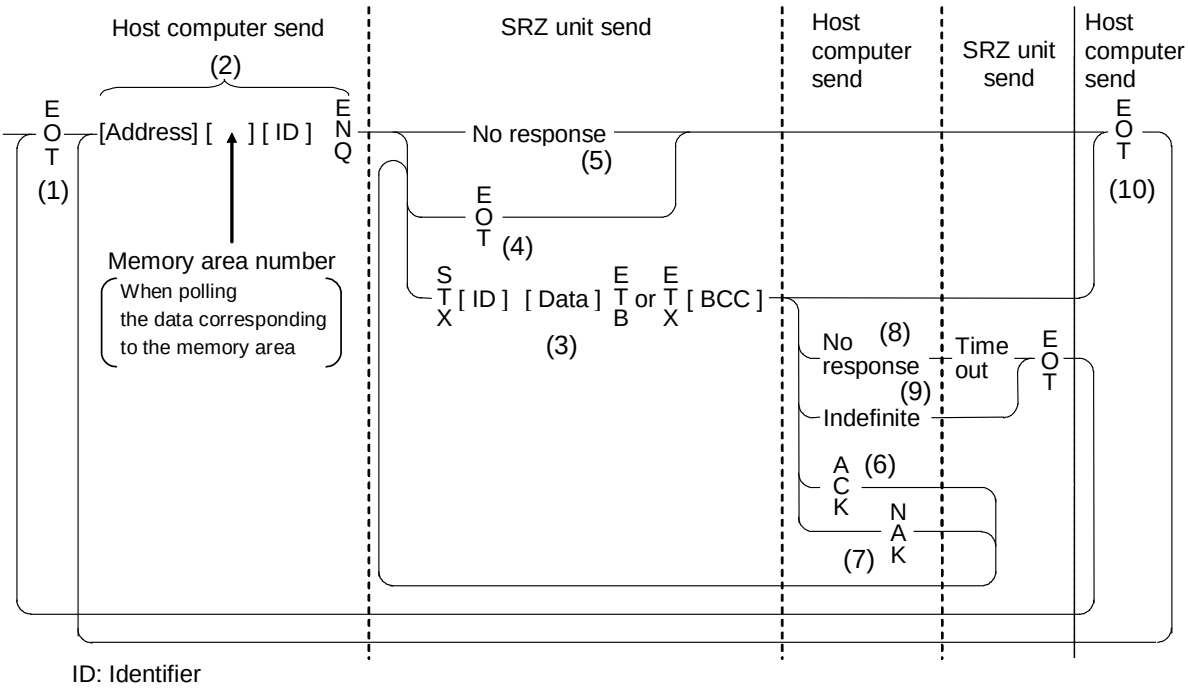
- The Polling/Selecting procedures are a centralized control method where the host computer controls the entire process. The host computer initiates all communication so the SRZ unit responds according to queries and commands from the host.

- The code use in communication is 7-bit ASCII code including transmission control characters.
  Transmission control characters used in SRZ unit:
  EOT (04H), ENQ (05H), ACK (06H), NAK (15H), STX (02H), ETB (17H), ETX (03H)
  ( ): Hexadecimal

Data send/receive state can be monitored by using the communication tool (PROTEM2, WinUCI-SRZ). The communication tool (PROTEM2, WinUCI-SRZ) can be downloaded from the official RKC website:
http://www.rkcinst.com/.

6.1 Polling

Polling is the action where the host computer requests one of the connected SRZ units to transmit data.
An example of the polling procedure is shown below:



6.1.1 Polling procedures

(1) Data link initialization

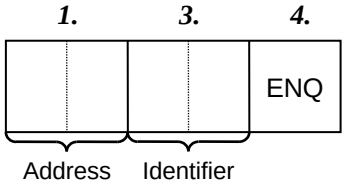
Host computer sends EOT to the controllers to initiate data link before polling sequence.

(2) Data sent from host computer - Polling sequence

The host computer sends the polling sequence in the following two types of formats:
- Format in which no Memory area number is specified, and
- Format in which the Memory area number is specified.

- When no Memory area number is specified

  To be sent in this format for any identifier not corresponding to the memory area.

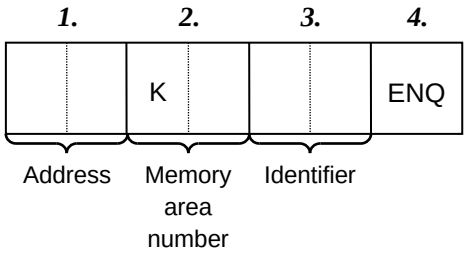


Example:

0	1	M	1	ENQ

- When the Memory area number is specified

  To be sent in this format for any identifier corresponding to the memory area.



Example:

0	1	K	1	S	1	ENQ

1. Address (2 digits)
This data is a unit address of the SRZ for polled and must be the same as the unit address set value in item **4.1.1 Address setting (P. 16)**.

The polling address which transmitted a message once becomes effective so long as data link is not initialized by transmit and receive of EOT.

2. Memory area number (2 digits)
This is the identifier to specify the Memory area number. It is expressed by K1 to K8 to each Memory area number (from 1 to 8). If the Memory area number is assigned with K0, this represents that Control area is specified.

The memory area now used for control is called Control area.

If the Memory area number is not specified when polling the identifier corresponding to the memory area, this represents that the Control area is specified.

If any identifier not corresponding to the memory area is assigned with a Memory area number, this Memory area number is ignored.

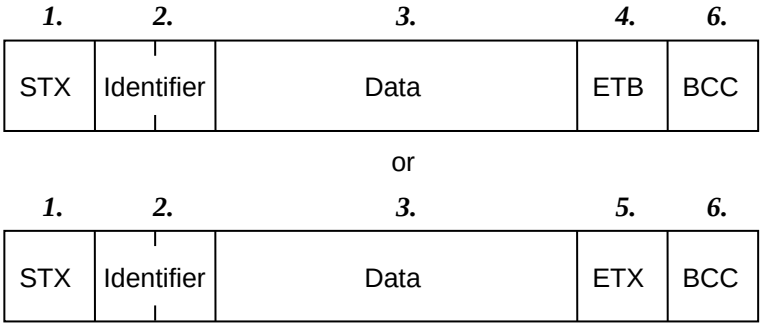
3. Identifier (2 digits)
The identifier specifies the type of data that is requested from the SRZ unit. Always attach the ENQ code to the end of the identifier.

☞ Refer to **8. COMMUNICATION DATA LIST (P. 57)**.

4. ENQ
The ENQ is the transmission control character that indicates the end of the polling sequence. The host computer then must wait for a response from the SRZ unit.

(3) Data sent from the SRZ unit

If the polling sequence is received correctly, the SRZ unit sends data in the following format:



If the length of send data (from STX to BCC) exceeds 129 bytes*, it is divided into blocks by ETB. In this case, the succeeding divided data is sent after STX.

* The length of data may exceed 129 bytes when polling the identifier of the data in 7 digits. When the functions of data located in the second or sequential blocks of send data are set to unused, the data will be added to the end of the previous block. (Up to 135 bytes can be sent.)

☞ For the data of unused function, refer to the Appendix (P. 118).

1. STX
STX is the transmission control character which indicates the start of the text transmission (identifier and data).

2. Identifier (2 digits)
The identifier indicates the type of data (measured value, status and set value) sent to the host computer.

☞ For the communication data, refer to **8. COMMUNICATION DATA LIST (P. 57)**.

3. Data
Data which is indicated by an identifier of SRZ unit, consisting of channel numbers, data, etc. Each channel number and data are delimited by a space (20H). The data and the next channel number are delimited by a comma (2CH).

- Channel number: 3-digit ASCII code, not zero-suppressed. Channels without channel numbers may exist depending on the type of identifier.
  Refer to **6.4 Channel Number of Communication (P. 39)**.
- Data: ASCII code, zero-suppressed with spaces (20H). The number of digits varies depending on the type of identifier.

Memory area soak time monitor and Area soak time become the following data:

- When data range is 0 hour 00 minute to 99 hours 59 minutes:
  Data range is 0:00 to 99:59, punctuation of time unit is expressed in colon ": (3AH)."
- When data range is 0 minute 00 second to 199 minutes 59 seconds:
  Data range is 0:00 to 199:59, punctuation of time unit is expressed in colon ": (3AH)."

"0" (without a decimal point) is sent for unused channels and for data that is invalid due to the function selection.

4. ETB
Transmission control character indicating the end of the block.

5. ETX
Transmission control character indicating the end of the text.

6. BCC
BCC (Block Check Character) detects error by using horizontal parity (even number).

Calculation method of BCC: *Exclusive OR* all data and characters from STX through ETB or ETX, not including STX.

Example:

STX	M	1	0	0	1				1	5	0	.	0	ETX	BCC
	4DH	31H	30H	30H	31H	20H	20H	20H	31H	35H	30H	2EH	30H	03H	←

Hexadecimal numbers

BCC = 4DH ⊕ 31H ⊕ 30H ⊕ 30H ⊕ 31H ⊕ 20H ⊕ 20H ⊕ 20H ⊕ 31H ⊕ 35H ⊕ 30H ⊕ 2EH ⊕ 30H ⊕ 03H = 44H
(⊕: *Exclusive OR*)
Value of BCC becomes 44H

(4) EOT send (Ending data transmission from the SRZ unit)

In the following cases, the SRZ unit sends EOT to terminate the data link:

- When the specified identifier is invalid
- When there is an error in the data format
- When all the data has been sent
- When the module that relates to the identifier is not connected

(5) No response from the SRZ unit

The SRZ unit will not respond if the polling address is not received correctly. It may be necessary for the host computer to take corrective action such as a time-out.

(6) ACK (Acknowledgment)

An acknowledgment ACK is sent by the host computer when data received is correct. When the SRZ unit receives ACK from the host computer, the SRZ unit will send any remaining data of the next identifier without additional action from the host computer. When host computer determines to terminate the data link, EOT is sent from the host computer.

- When ACK is received after ETX and BCC are sent, the next identifier data is sent according to the order of the communication data list.
- When ACK is received after ETB and BCC are sent, the data after ETB is sent.

(7) NAK (Negative acknowledge)

If the host computer does not receive correct data from the SRZ unit, it sends a negative acknowledgment NAK to the SRZ unit. The SRZ unit will re-send the same data when NAK is received. This cycle will go on continuously until either recovery is achieved or the data link is corrected at the host computer.
The format of the data that an SRZ unit re-sends is as follows.

(8) No response from host computer

When the host computer does not respond within approximately three seconds after the SRZ unit sends data, the SRZ unit sends EOT to terminate the data link (time-out time: about 3 seconds).

(9) Indefinite response from host computer

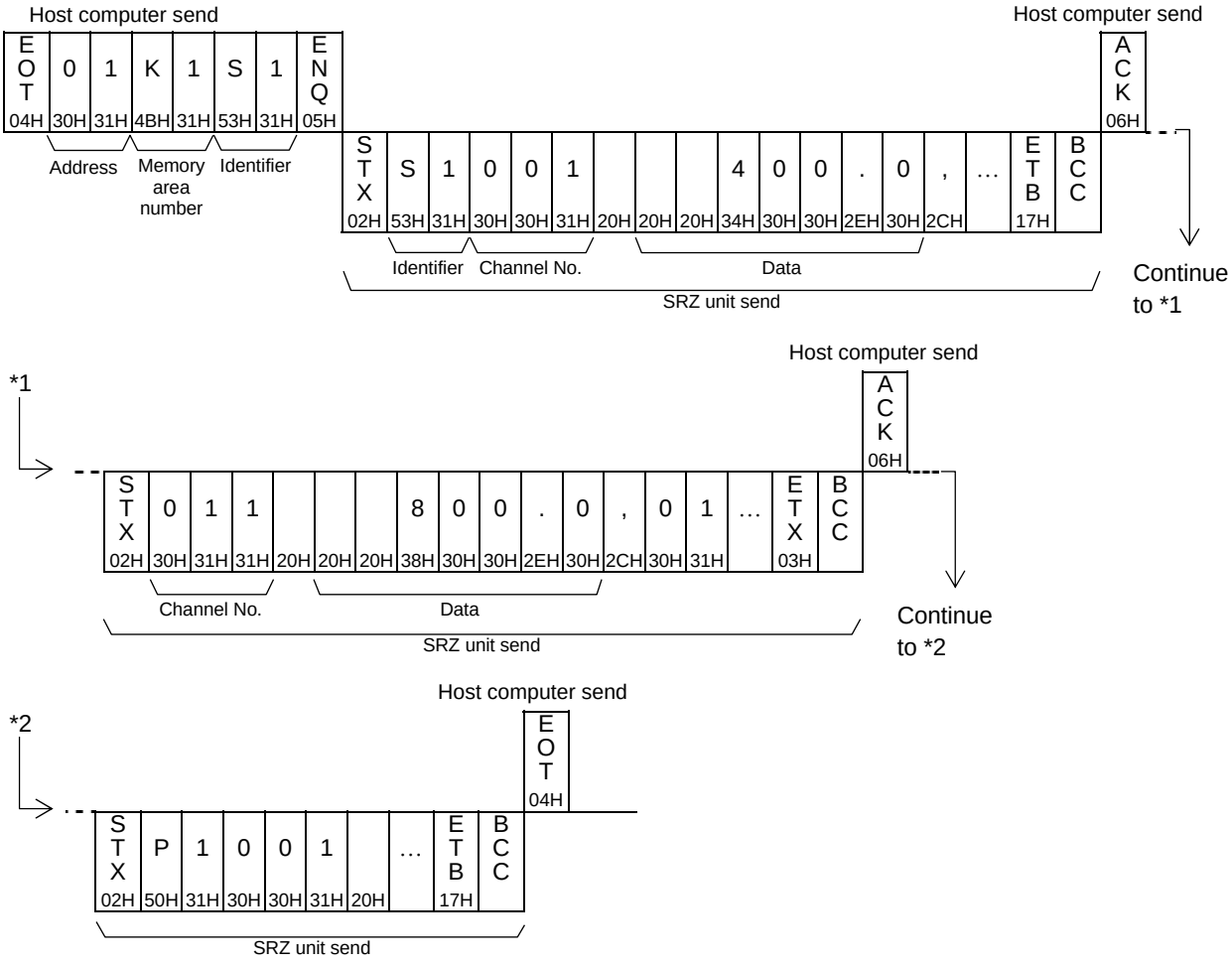
The SRZ unit sends EOT to terminate the data link when the host computer response is indefinite.

(10) EOT (Data link termination)

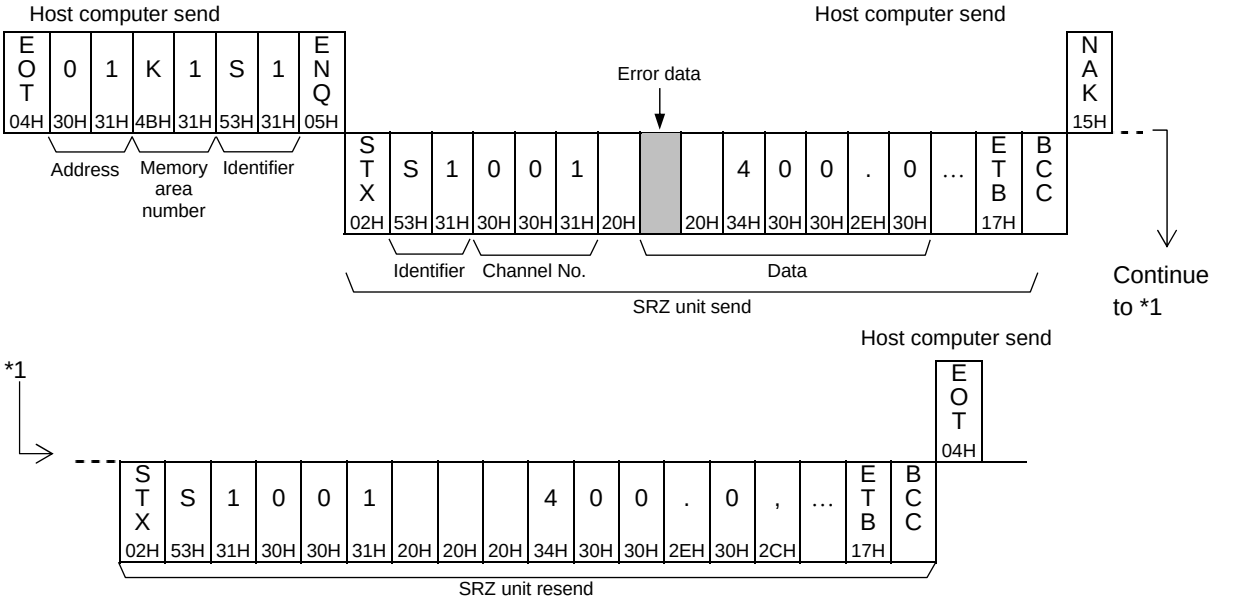
The host computer sends EOT message when it is necessary to suspend communication with the SRZ unit or to terminate the data link due lack of response from the SRZ unit.

6.1.2 Polling procedure example (when the host computer requests data)

- **Normal transmission**

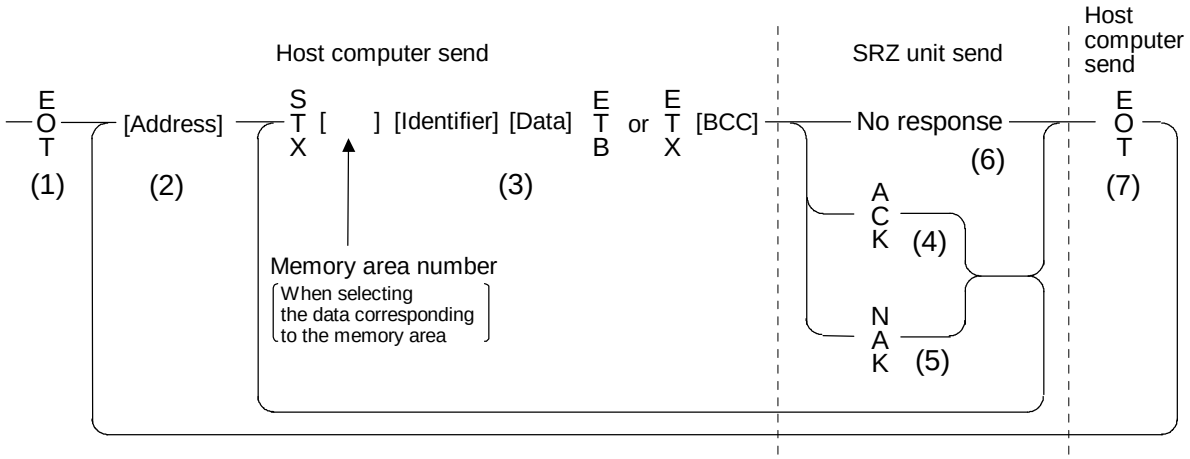


- **Error transmission**



6.2 Selecting

Selecting is the action where the host computer requests one of the connected SRZ units to receive data. An example of the selecting procedure is shown below:



6.2.1 Selecting procedures

(1) Data link initialization

Host computer sends EOT to the SRZ unit to initiate data link before selecting sequence.

(2) Sending selecting address from the host computer

Host computer sends selecting address for the selecting sequence.

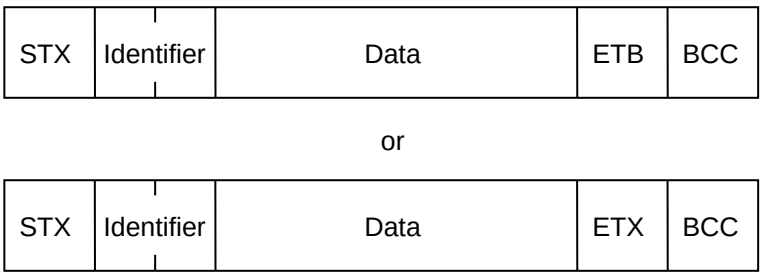
Address (2 digits):
This data is a unit address of the SRZ to be selected and must be the same as the unit address set value in item **4.1.1 Address setting (P. 16)**.

As long as the data link is not initialized by sending or receiving EOT, the selecting address once sent becomes valid.

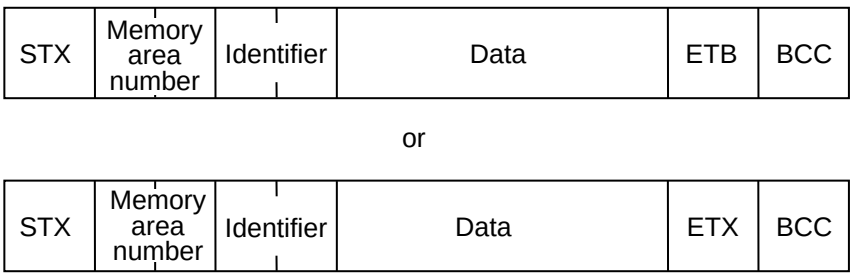
(3) Data sent from the host computer

The host computer sends data for the selecting sequence with the following format:

- When no Memory area number is specified



- When the Memory area number is specified



☞ For the STX, Memory area number Identifier, Data, ETB, ETX and BCC, refer to **6.1.1 Polling procedures (P. 27)**.

If the length of send data (from STX to BCC) exceeds 129 bytes, it is divided into blocks by ETB. In this case, the succeeding divided data is sent after STX.

Area soak time set data as the following:

- When data range is 0 hour 00 minute to 99 hours 59 minutes:
  Data range is 0:00 to 99:59, punctuation of time unit is expressed in colon ": (3AH)."
- When data range is 0 minute 00 second to 199 minutes 59 seconds:
  Data range is 0:00 to 199.59, punctuation of time unit is expressed in colon ": (3AH)."

In addition to above, when minute and second data are set in more than 60, become as the following:

Example: 1:65 (1 hour 65 minutes) → 2:05 (2 hours 05 minutes)
0:65 (0 minute 65 seconds) → 1:05 (1 minute 05 seconds)

- **About numerical data**

[The data that receipt of letter is possible]

- Data with numbers below the decimal point omitted or zero-suppressed data can be received.
  (Number of digits: Within 7 digits)
  <Example>
  When data send with –001.5, –01.5, –1.5, –1.50, –1.500 at the time of –1.5, SRZ unit can receive a data.

- When the host computer sends data with decimal point to item of without decimal point, the SRZ unit receives a message with the value that cut off below the decimal point.
  <Example>
  When setting range is 0 to 200, the SRZ unit receives as a following.

Send data	0.5	100.5
Receive data	0	100

- The SRZ unit receives value in accordance with decided place after the decimal point. The value below the decided place after the decimal point is cut off.
  <Example>
  When setting range is –10.00 to +10.00, the controller receives as a following.

Send data	–.5	–.058	.05	–0
Receive data	–0.50	–0.05	0.05	0.00

If the host computer sends “decimal point only (.)” or “minus sign and decimal point only (-.),” the SRZ unit receives this as “0.” However, the decimal point position will be the same as the decimal point position of the transmitted data item.

[The data that receipt of letter is impossible]

The SRZ unit sends NAK when received a following data.

+	Plus sign and the data that gained plus sing
–	Only minus sign (there is no figure)

(4) ACK (Acknowledgment)

An acknowledgment ACK is sent by the SRZ unit when data received is correct. When the host computer receives ACK from the SRZ unit, the host computer will send any remaining data. If there is no more data to be sent to the SRZ unit, the host computer sends EOT to terminate the data link.

(5) NAK (Negative acknowledge)

If the SRZ unit does not receive correct data from the host computer, it sends a negative acknowledgment NAK to the host computer. Corrections, such as re-send, must be made at the host computer.

The send conditions of NAK (after reception of ETX or BCC)

- When an error occurs on communication the line (parity, framing error, etc.)
- When a BCC check error occurs
- When the specified identifier is invalid
- When receive data exceeds the setting range
- When receive data is the identifier of RO (read only)
- When the module related to the identifier received by the SRZ is not connected

The send conditions of NAK (after reception of ETB or BCC)

- When a BCC check error occurs

(6) No response from SRZ unit

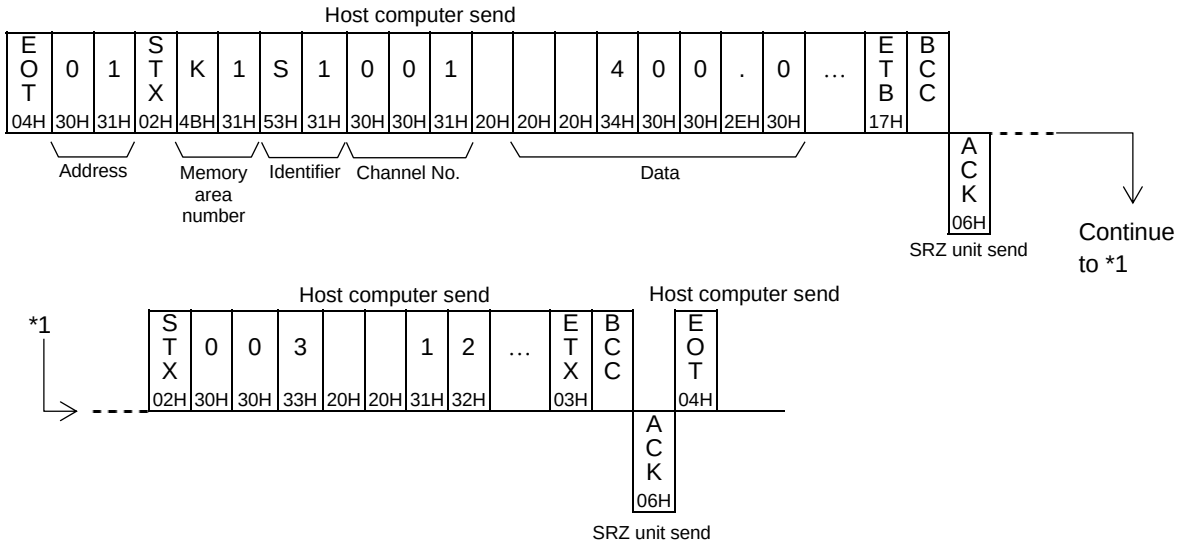
The SRZ unit does not respond when it can not receive the selecting address, STX, ETB, ETX or BCC.

(7) EOT (Data link termination)

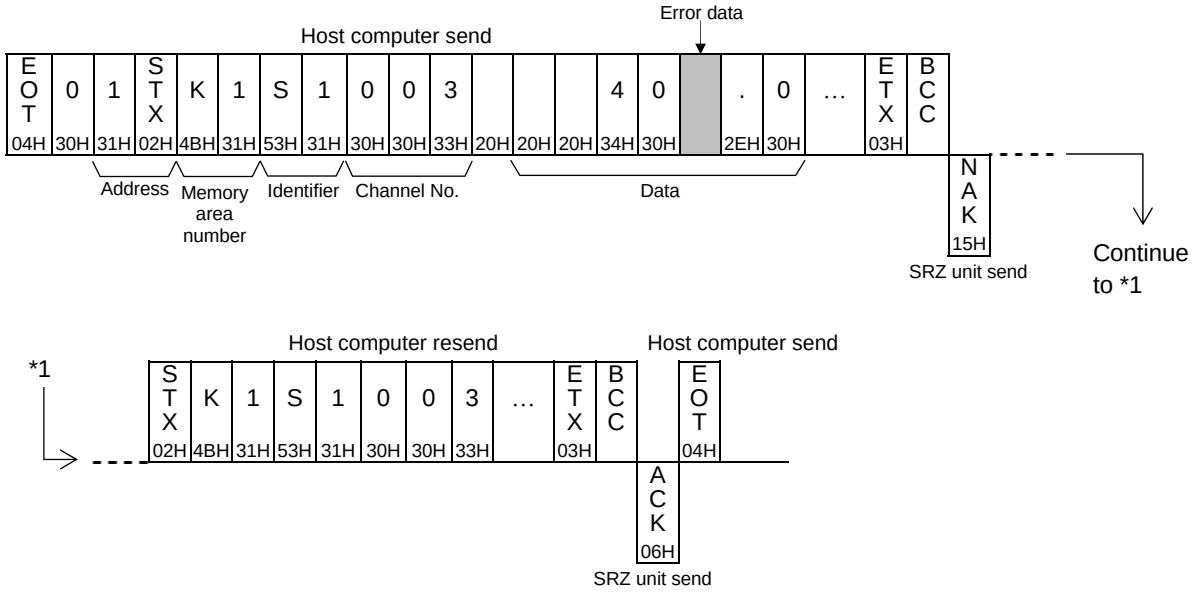
The host computer sends EOT when there is no more data to be sent from the host computer or there is no response from the SRZ unit.

6.2.2 Selecting procedure example (when the host computer sends data)

- **Normal transmission**



- **Error transmission**



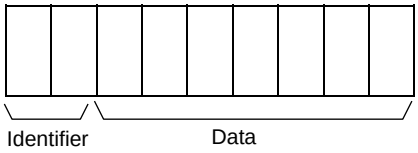
6.3 Communication Data Structure

■ Data description

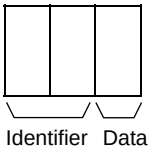
Part of the data above is shown below.

- **Data for each unit (Without channel)**

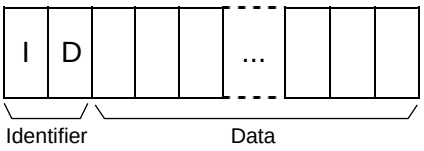
Data length 7 digits



Data length 1 digit

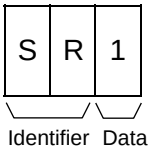


Data length 32 digits (Model code)



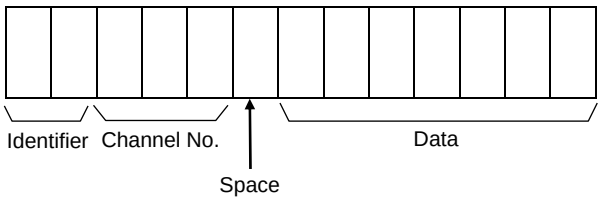
Data length 8 digits (ROM version)

Example) Data structure for control RUN/STOP switching in each SRZ unit

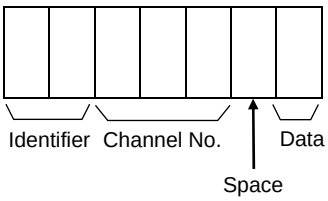


- **Data for each module**

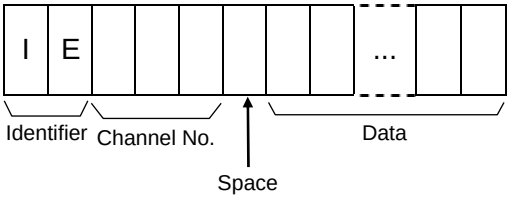
Data length 7 digits



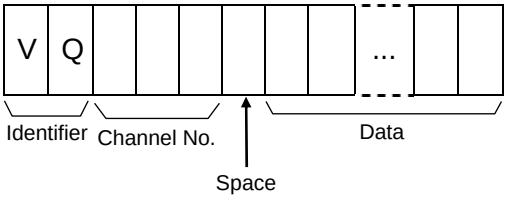
Data length 1 digit



Data length 32 digits (Model code)

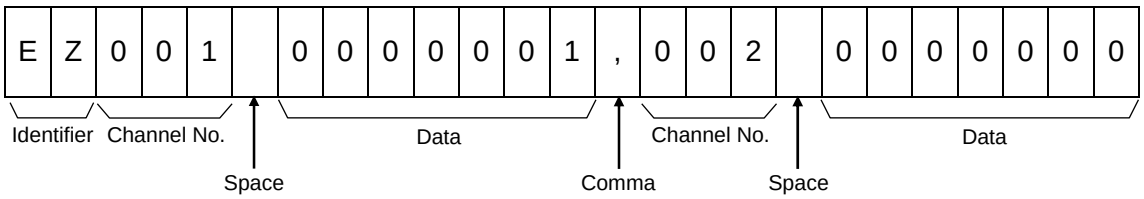


Data length 8 digits (ROM version)



Continued on the next page.

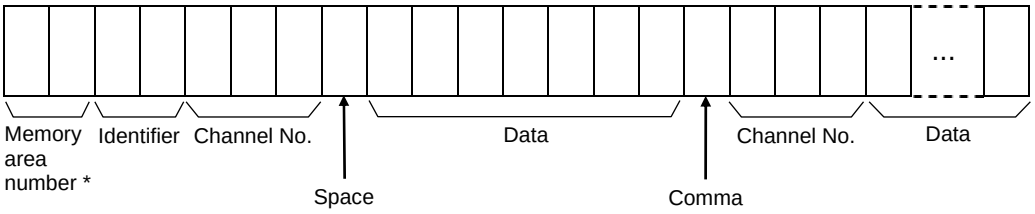
Example) Data structure of error codes of Z-TIO, Z-DIO and Z-CT modules



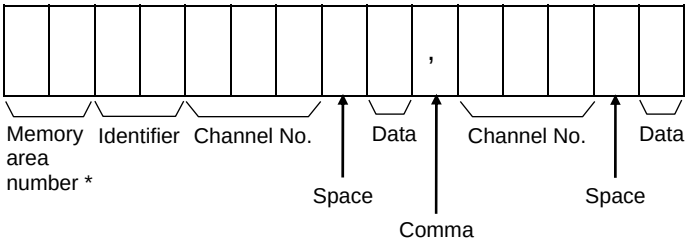
☞ For the calculation method of the channel number, refer to **6.4 Channel Number of Communication (P. 39)**.

- **Data for each channel**

Data length 7 digits

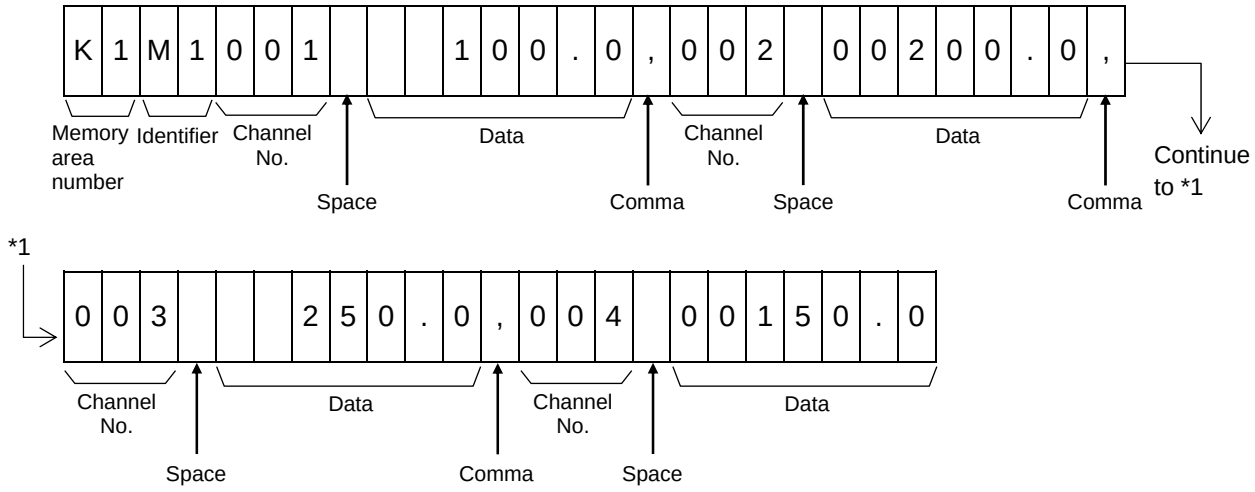


Data length 1 digit



* To select data corresponding to a memory area, specify the number of the appropriate memory area.
If a Memory area number is specified for data that does not correspond to a memory area, the specification will be invalid.

Example) Data configuration of measured value (PV) of Z-TIO module



☞ For the calculation method of the channel number, refer to **6.4 Channel Number of Communication (P. 39)**.

6.4 Channel Number of Communication

The channel numbers for handling communication data consist of the following three types.

- Data for each module (The channel number that is assigned regardless of module type)

  Regardless of the function module type, successive channel numbers common to the modules are assigned in the SRZ unit.

  [Example] Error codes (identifier: EZ) for each function module, Integrated operating time monitors (identifier: UV), and other data.

- Data for each module (The channel number for every module type)

  Channel numbers are assigned to the modules by function module type.

  [Example] Digital input (DI) state 1 (identifier: L1) and DO manual output 1 (identifier: Q4) of a Z-DIO module, and other data.

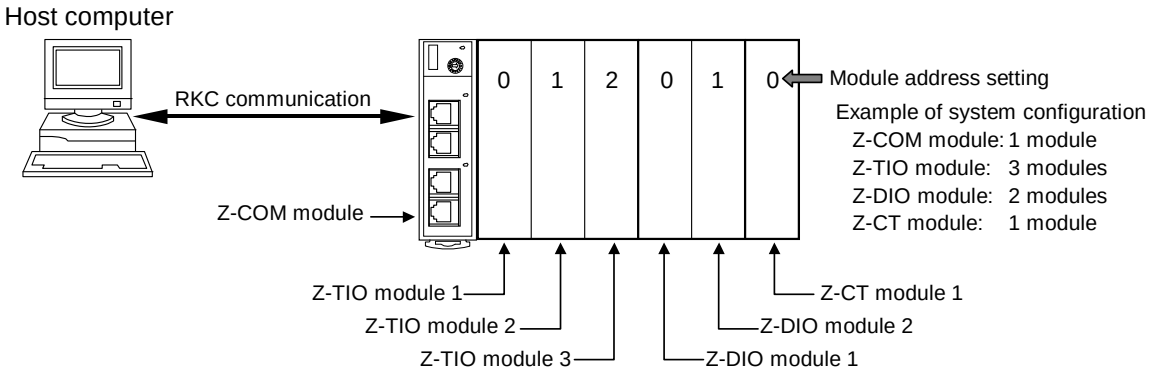
- Data for each channel

  For each function module type, channel numbers are successively assigned in the SRZ unit.

  [Example] Measured values (PV) (identifier: M1) and Event 1 set values (identifier: A1) of a Z-TIO module, and other data.

■ Calculation method of the channel number

The method of calculating the channel number is explained below using the example of an SRZ unit configuration.



(1) Data for each module (The channel number that is assigned regardless of module type)

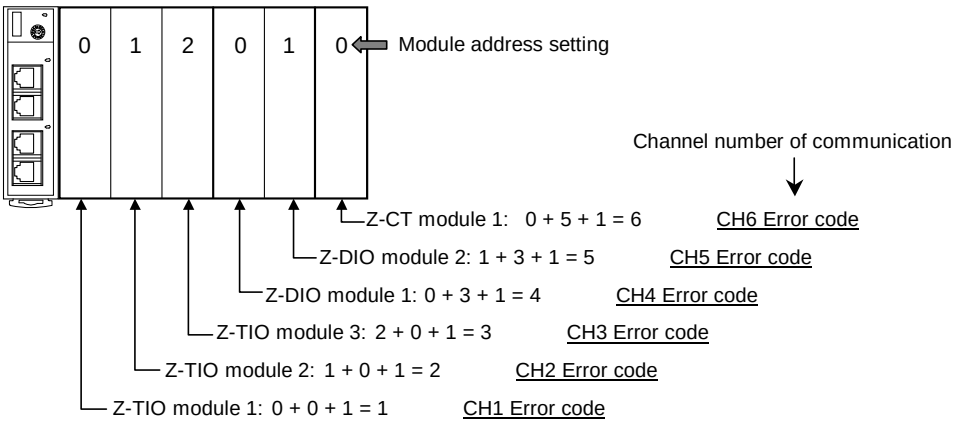
Regardless of the function module type, successive channel numbers common to the modules are assigned in the SRZ unit.

Computing equation:
Channel number of communication = Module address setting + Offset value + 1

Offset value:
- Offset value of Z-TIO module: 0
- Offset value of Z-DIO module: Number of Z-TIO module (Identifier: QY*)
- Offset value of Z-CT module:
  Number of Z-TIO module (Identifier: QY*) + Number of Z-CT modules (Identifier: QO*)

* If the number of connected modules is not updated to the most recent number, it will not be possible to calculate the correct channel number.

[Example] Channel number of Error code (Identifier: EZ) of Z-TIO, Z-DIO, and Z-CT modules

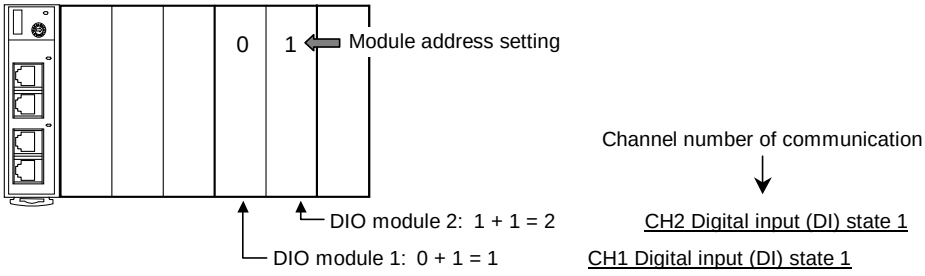


(2) Data for each module (The channel number for every module type)

Channel numbers are assigned to the modules by function module type.

Computing equation:
Channel number of communication = Module address setting + 1

[Example] Channel number of Digital input (DI) state 1 (Identifier: L1) of Z-DIO module



(3) Data for each channel

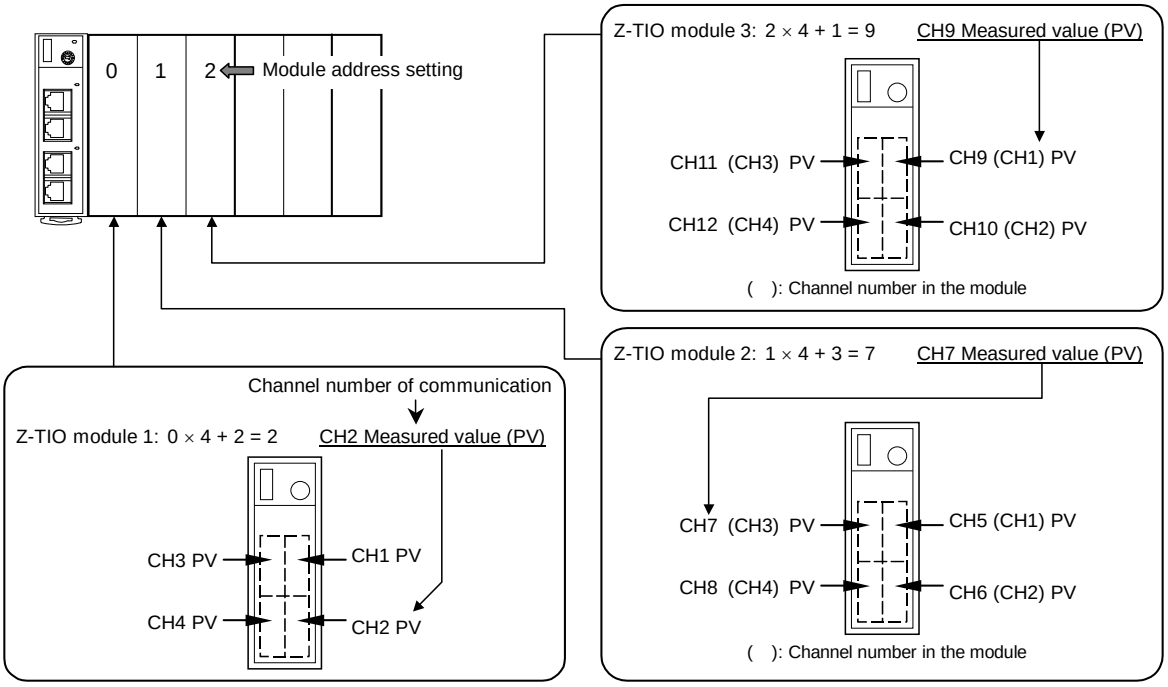
For each function module type, channel numbers are successively assigned in the SRZ unit.

Computing equation:
Channel number of communication =
(Module address setting × Maximum channel number of the function module)
+ Channel number in the module

Maximum channel number of the functional module:
- Maximum channel number of Z-TIO module: 4
- Maximum channel number of Z-DIO module: 8
- Maximum channel number of Z-CT module: 12

Channel number in the module:
- Z-TIO module: 1 to 4
- Z-DIO module: digital input 1 to 8, digital output 1 to 8
- Z-CT module: 1 to 12

[Example] Channel number of Measured value (PV) (Identifier: M1) of Z-TIO module



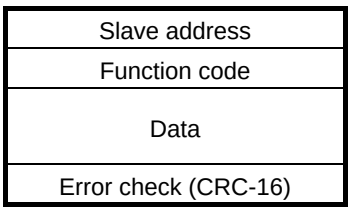
7. MODBUS

The master controls communication between master and slave. A typical message consists of a request (query message) sent from the master followed by an answer (response message) from the slave (SRZ unit). When master begins data transmission, a set of data is sent to the slave in a fixed sequence. When it is received, the slave decodes it, takes the necessary action, and returns data to the master.

Data send/receive state can be monitored by using our communication tool (PROTEM2). The communication tool (PROTEM2) can be downloaded from the official RKC website: http://www.rkcinst.com/.

7.1 Message Format

The message consists of four parts: slave address, function code, data, and error check code which are always transmitted in the same sequence.



Message format

■ Slave address

The slave address is a number from 0 to F manually set at the address setting switch located at the front of Z-COM module.

For details, refer to **4.1.1 Address setting (P. 16)**.

Although all connected slave units receive the query message sent from the master, only the slave with the slave address coinciding with the query message will accept the message.

■ Function code

The function codes are the instructions set at the master and sent to the slave describing the action to be executed. The function codes are included when the slave responds to the master.

For details, refer to **7.2 Function Code (P. 43)**.

■ Data

The data to execute the function specified by the function code is sent to the slave and corresponding data returned to the master from the slave.

For details, refer to **7.6 Register Read and Write (P. 48)**, **7.7 Data Processing Precautions (P. 52)** and **8. COMMUNICATION DATA LIST (P. 57)**.

■ Error check

An error checking code (CRC-16: Cyclic Redundancy Check) is used to detect an error in the signal transmission.

For details, refer to **7.5 Calculating CRC-16 (P. 45)**.

7.2 Function Code

- **Function code contents**

Function code (Hexadecimal)	Function	Contents
03H	Read holding registers	Measured value, control output value, current transformer input measured value, Event status, etc.
06H	Preset single register	Set value, PID constants, event set value, etc.
08H	Diagnostics (loopback test)	Loopback test
10H	Preset multiple registers	Set value, PID constants, event set value, etc.

- **Message length of each function (Unit: byte)**

Function code (Hexadecimal)	Function	Query message		Response message	
		Min	Max	Min	Max
03H	Read holding registers	8	8	7	255
06H	Preset single register	8	8	8	8
08H	Diagnostics (loopback test)	8	8	8	8
10H	Preset multiple registers	11	255	8	8

7.3 Communication Mode

Signal transmission between the master and slaves is conducted in Remote Terminal Unit (RTU) mode.

Items	Contents
Data bit length	8-bit (Binary)
Start mark of message	Unused
End mark of message	Unused
Message length	Refer to **7.2 Function Code**
Data time interval	Less than 24-bit time *
Error check	CRC-16 (Cyclic Redundancy Check)

* When sending a command message from the master, set intervals of data configuring one message to time shorter than the 24-bit time. If time intervals become time longer than the 24-bit time the relevant slave assumes that message sending from the master is terminated to deform the message format. As a result, the slave does not make a response.

7.4 Slave Responses

(1) Normal response

- In the response message of the Read Holding Registers, the slave returns the read out data and the number of data items with the same slave address and function code as the query message.
- In the response message of the Preset Single Register, the slave returns the same message as the query message.
- In the response message of the Diagnostics (Loopback test), the slave returns the same message as the query message.
- In the response message of the Preset Multiple Registers, the slave returns the slave address, the function code, starting number, and number of holding registers in the multi-query message.

(2) Defective message response

- If the query message from the master is defective, except for transmission error, the slave (SRZ unit) returns the error response message without any action.

  Example: If there is a problem in the data range of CH3 when writing data of four channels, the data of CH1 and CH2 will be written. The data of CH3 and CH4 will be disregarded and an error response message will be returned.

- If the self-diagnostic function of the slave (SRZ unit) detects an error, the slave (SRZ unit) will return an error response message to all query messages.
- The function code of each error response message is obtained by adding 80H to the function code of the query message.

Slave address
Function code
Error code
Error check CRC-16

Error response message

Error code	Contents
1	Function code error (An unsupported function code was specified)
2	When the mismatched address is specified.
3	• When the specified number of data items in the query message exceeds the maximum number of data items available • When the data written exceeds the setting range
4	Self-diagnostic error response

(3) No response

The slave (SRZ unit) ignores the query message and does not respond when:

- The slave address in the query message does not coincide with any slave address settings.
- The CRC code of the master does not coincide with that of the slave.
- Transmission error such as overrun, framing, parity and etc., is found in the query message.
- Data time interval in the query message from the master exceeds 24-bit time.

7.5 Calculating CRC-16

The Cyclic Redundancy Check (CRC) is a 2 byte (16-bit) error check code. After constructing the data message, not including start, stop, or parity bit, the master calculates a CRC code and appends this to the end of the message. The slave will calculate a CRC code from the received message, and compare it with the CRC code from the master. If they do not match, a communication error has occurred and the slave does not respond.

The CRC code is formed in the following sequence:

1. Load FFFFH to a 16-bit CRC register.

2. *Exclusive OR* (⊕) the first byte (8 bits) of the message with the CRC register. Return the result to the CRC register.

3. Shift the CRC register 1 bit to the right.

4. If the carry flag is 1, *exclusive OR* the CRC register with A001 hex and return the result to the CRC register. If the carry flag is 0, repeat step ***3***.

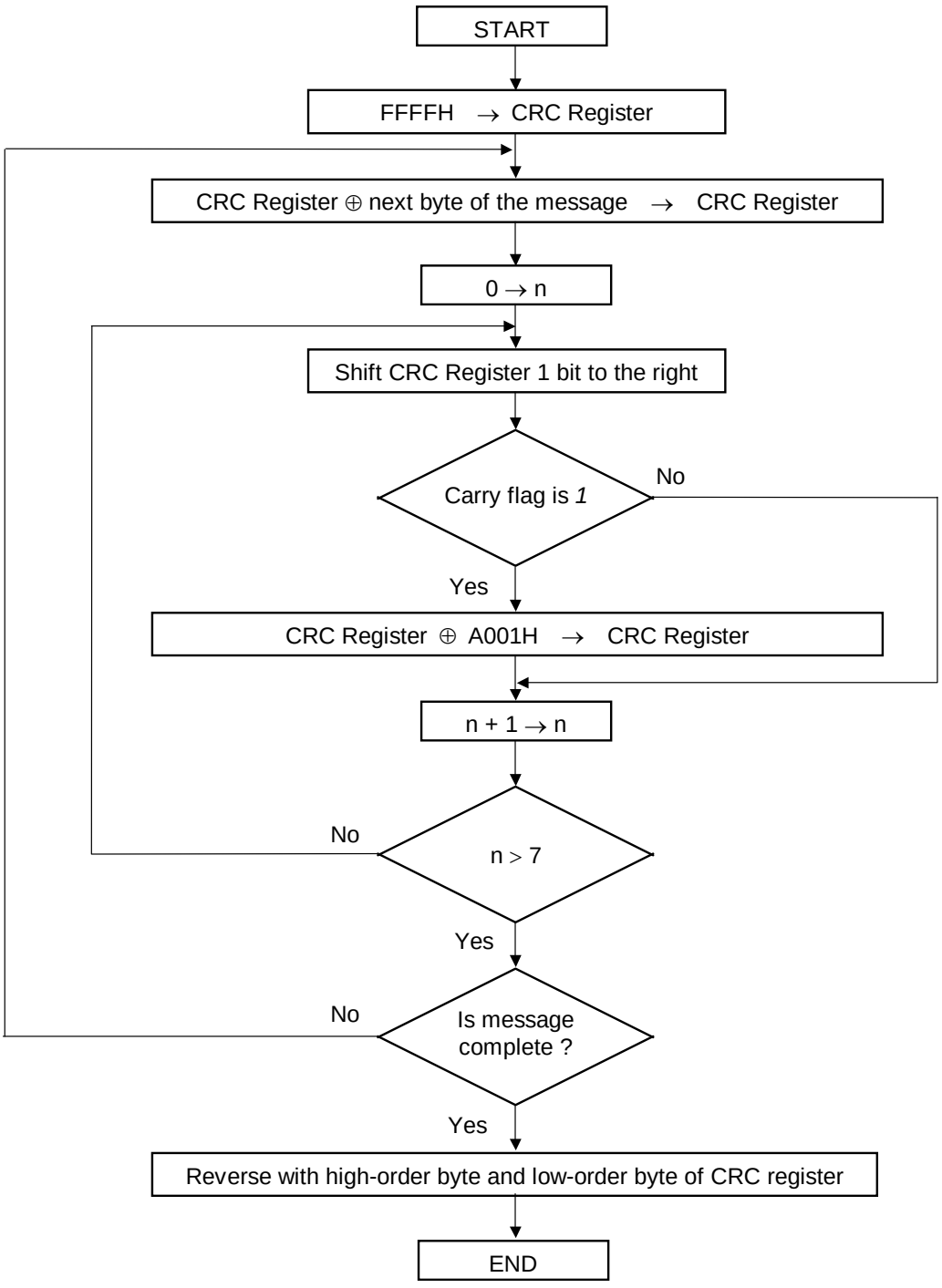
5. Repeat step ***3*** and ***4*** until there have been 8 shifts.

6. *Exclusive OR* the next byte (8 bits) of the message with the CRC register.

7. Repeat step ***3*** through ***6*** for all bytes of the message (except the CRC).

8. The CRC register contains the 2 byte CRC error code. When they are appended to the message, the low-order byte is appended first, followed by the high-order byte.

■ The flow chart of CRC-16



The ⊕ symbol indicates an *exclusive OR* operation. The symbol for the number of data bits is *n*.

■ Example of a CRC calculation in the ‘C’ language

This routine assumes that the data types ‘uint16’ and ‘uint8’ exists. Theses are unsigned 16-bit integer (usually an ‘unsigned short int’ for most compiler types) and unsigned 8-bit integer (unsigned char). ‘z_p’ is a pointer to a Modbus message, and ‘z_messaage_length’ is its length, excluding the CRC. Note that the Modbus message will probably contain NULL characters and so normal C string handling techniques will not work.

uint16 calculate_crc（byte *z_p, unit16 z_message_length）

```
/* CRC runs cyclic Redundancy Check Algorithm on input z_p */
/* Returns value of 16 bit CRC after completion and        */
/* always adds 2 crc bytes to message                      */
/* returns 0 if incoming message has correct CRC           */

{
    uint16 CRC= 0xffff;
    uint16 next;
    uint16 carry;
    uint16 n;
    uint8 crch, crcl;

    while (z_messaage_length--) {
        next = (uint16) *z_p;
        CRC ^= next;
        for (n = 0; n < 8; n++) {
            carry = CRC & 1;
            CRC >>= 1;
            if (carry) {
                CRC ^= 0xA001;
            }
        }
        z_p++;
    }
    crch = CRC / 256;
    crcl = CRC % 256
    z_p [z_messaage_length++] = crcl;
    z_p [z_messaage_length] = crch;
    return CRC;
}
```

7.6 Register Read and Write

7.6.1 Read holding registers [03H]

The query message specifies the starting register address and quantity of registers to be read.
The contents of the holding registers are entered in the response message as data, divided into two parts: the high-order 8-bit and the low-order 8-bit, arranged in the order of the register numbers.

Example: The contents of the four holding registers from 01FCH to 01FFH are the read out from slave address 2.

Query message

Slave address		02H	
Function code		03H	
Starting number	High	01H	First holding register address
	Low	FCH	
Quantity	High	00H	The setting must be between 1 (0001H) and 125 (007DH).
	Low	04H	
CRC-16	High	85H	
	Low	F6H	

Normal response message

Slave address		02H	
Function code		03H	
Number of data		08H	→ Number of holding registers × 2
First holding register contents	High	01H	
	Low	24H	
Next holding register contents	High	01H	
	Low	1BH	
Next holding register contents	High	01H	
	Low	2BH	
Next holding register contents	High	01H	
	Low	22H	
CRC-16	High	AAH	
	Low	F3H	

Error response message

Slave address		02H
80H + Function code		83H
Error code		03H
CRC-16	High	F1H
	Low	31H

7.6.2 Preset single register [06H]

The query message specifies data to be written into the designated holding register. The write data is arranged in the query message with high-order 8-bit first and low-order 8-bit next. Only R/W holding registers can be specified.

Example: Data is written into the holding register 0ADCH of slave address 1.

Query message

Slave address		01H
Function code		06H
Holding register number	High	0AH
	Low	DCH
Write data	High	00H
	Low	64H
CRC-16	High	4AH
	Low	03H

} Any data within the range

Normal response message

Slave address		01H
Function code		06H
Holding register number	High	0AH
	Low	DCH
Write data	High	00H
	Low	64H
CRC-16	High	4AH
	Low	03H

} Contents will be the same as query message data.

Error response message

Slave address		01H
80H + Function code		86H
Error code		02H
CRC-16	High	C3H
	Low	A1H

7.6.3 Diagnostics (Loopback test) [08H]

The master's query message will be returned as the response message from the slave (SRZ unit).
This function checks the communication system between the master and slave (SRZ unit).

Example: Loopback test for slave address 1

Query message

Slave address		01H	
Function code		08H	
Test code	High	00H	Test code must be set to 00.
	Low	00H	
Data	High	1FH	Any pertinent data
	Low	34H	
CRC-16	High	E9H	
	Low	ECH	

Normal response message

Slave address		01H	Contents will be the same as query message data.
Function code		08H	
Test code	High	00H	
	Low	00H	
Data	High	1FH	
	Low	34H	
CRC-16	High	E9H	
	Low	ECH	

Error response message

Slave address		01H
80H + Function code		88H
Error code		03H
CRC-16	High	06H
	Low	01H

7.6.4 Preset multiple registers [10H]

The query message specifies the starting register address and quantity of registers to be written.
The write data is arranged in the query message with high-order 8-bit first and low-order 8-bit next.
Only R/W holding registers can be specified.

Example: Data is written into the two holding registers from 0ADCH to 0ADDH of slave address 1.

Query message

Slave address		01H	
Function code		10H	
Starting number	High	0AH	First holding register address
	Low	DCH	
Quantity	High	00H	The setting must be between 1 (0001H) and 123 (007BH).
	Low	02H	
Number of data		04H	→ Number of holding registers × 2
Data to first register	High	00H	Any pertinent data
	Low	64H	
Data to next register	High	00H	
	Low	64H	
CRC-16	High	C0H	
	Low	32H	

Normal response message

Slave address		01H
Function code		10H
Starting number	High	0AH
	Low	DCH
Quantity	High	00H
	Low	02H
CRC-16	High	83H
	Low	EAH

Error response message

Slave address		01H
80H + Function code		90H
Error code		02H
CRC-16	High	CDH
	Low	C1H

7.7 Data Processing Precautions

- The numeric range of data used in Modbus protocol is 0000H to FFFFH. Only the set value within the setting range is effective.

  FFFFH represents –1.

- The Modbus protocol does not recognize data with decimal points during communication.

  Example1: When Heater break alarm (HBA) set value is 20.0 A, 20.0 is processed as 200, 200 = 00C8H

Heater break alarm (HBA) set value	High	00H
	Low	C8H

  Example2: When Set value (SV) is –20.0 °C, –20.0 is processed as –200, –200 = 0000H – 00C8H = FF38H

Set value (SV)	High	FFH
	Low	38H

- In this communication, the data that memory area includes handles different address with for Control area and for setting area.
- If data (holding register) exceeding the accessible address range is accessed, an error response message is returned.
- Read data of unused item is a default value.
- Any attempt to write to an unused item is not processed as an error. Data cannot be written into an unused item.
- If an error (data range error or address error) is detected in the data writing process, an error is returned. Writing is aborted at and after the addresses where an error occurred. After having completed the setting, check to see if the data was properly written.
- An attribute of the item for functions which are not in the controller is RO (read only). If read action to this item is performed, the read data will be “0.” If write action to this item is performed, no error message is indicated and no data is written.

  For details, refer to **8. COMMUNICATION DATA LIST (P. 57)**.

- Send the next command message at time intervals of 24 bits after the master receives the response message.

7.8 How to Use Memory Area Data

Memory area function can store up to 8 individual sets of SVs and parameters. One of the areas is used for control, and the currently selected area is Control area.
Memory area data can be used to check and change settings that belong to memory areas other than the Control area. Reading and writing of memory area data is performed by channel.

■ Read and write of memory area data

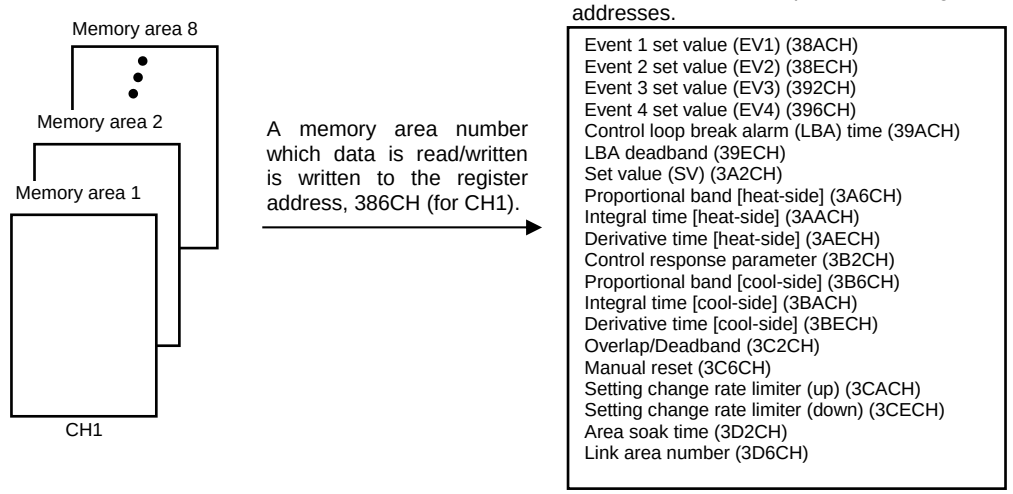
If any Memory area number to perform data read and write is specified by the Setting memory area number (386CH to 38ABH), data corresponding to the specified Memory area number is called up to the register addresses from 38ACH to 3DABH. By using these register addresses from 38ACH to 3DABH, it becomes possible to read and write data in any memory area.

	Register address			
	CH1	CH2	·····	CH64
Setting memory area number	386CH	386DH	·····	38ABH
Event 1 set value (EV1)	38ACH	38ADH	·····	38EBH
Event 2 set value (EV2)	38ECH	38EDH	·····	392BH
Event 3 set value (EV3)	392CH	392DH	·····	396BH
Event 4 set value (EV4)	396CH	396DH	·····	39ABH
Control loop break alarm (LBA) time	39ACH	39ADH	·····	39EBH
LBA deadband	39ECH	39EDH	·····	3A2BH
Set value (SV)	3A2CH	3A2DH	·····	3A6BH
Proportional band [heat-side]	3A6CH	3A6DH	·····	3AABH
Integral time [heat-side]	3AACH	3AADH	·····	3AEBH
Derivative time [heat-side]	3AECH	3AEDH	·····	3B2BH
Control response parameter	3B2CH	3B2DH	·····	3B6BH
Proportional band [cool-side]	3B6CH	3B6DH	·····	3BABH
Integral time [cool-side]	3BACH	3BADH	·····	3BEBH
Derivative time [cool-side]	3BECH	3BEDH	·····	3C2BH
Overlap/Deadband	3C2CH	3C2DH	·····	3C6BH
Manual reset	3C6CH	3C6DH	·····	3CABH
Setting change rate limiter (up)	3CACH	3CADH	·····	3CEBH
Setting change rate limiter (down)	3CECH	3CEDH	·····	3D2BH
Area soak time	3D2CH	3D2DH	·····	3D6BH
Link area number	3D6CH	3D6DH	·····	3DABH

← Register address to specify memory area

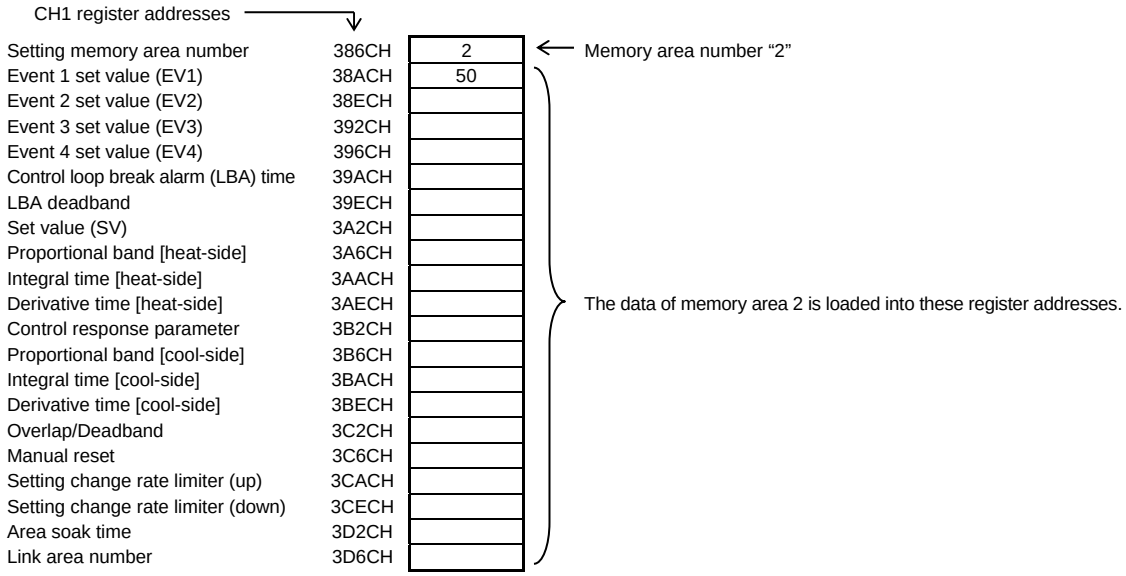
Register address of memory area data

☞ For the Memory area data list, refer to **8.6 Memory Area Data Address (Z-TIO Module) (P. 95)**.



[Example 1] When data on the Event 1 set value in Memory area 2 of CH1 is read

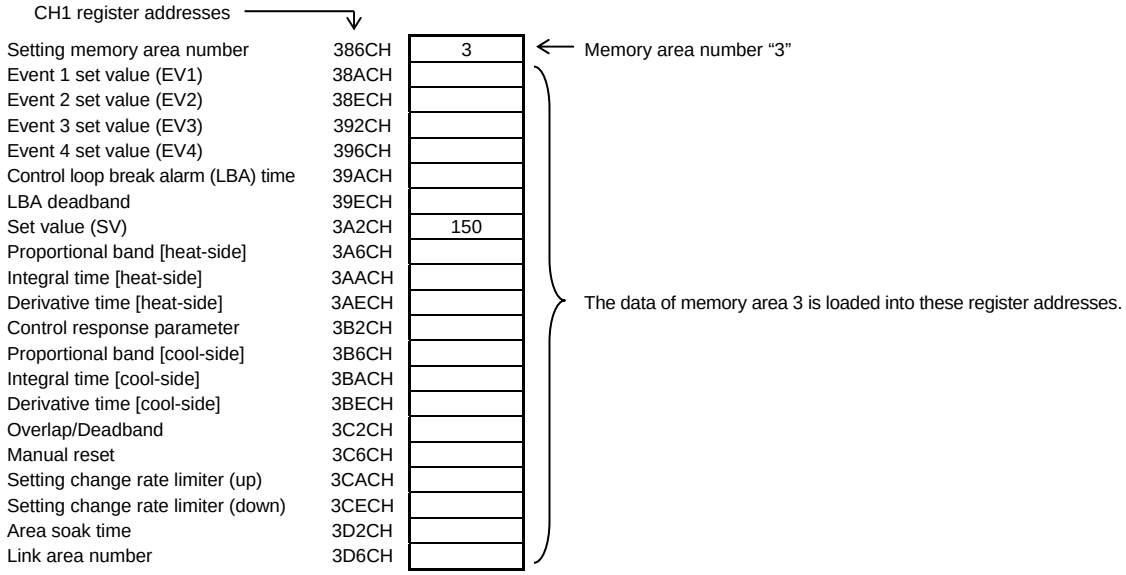
1. The Memory area number, “2” is written to the CH1 Setting memory area number (386CH). Data in Memory area 2 is called up to the CH1 register addresses.



2. Data “50” on Event 1 set value (38ACH) is read.

[Example 2] When the Set value (SV) in Memory area 3 of CH1 is changed to 200

1. The Memory area number, “3” is written to the CH1 Setting memory area number (386CH). Data in Memory area 3 is called up to the CH1 register addresses.



2. “200” is written to the Set value (SV) (3A2CH).

■ Control area transfer

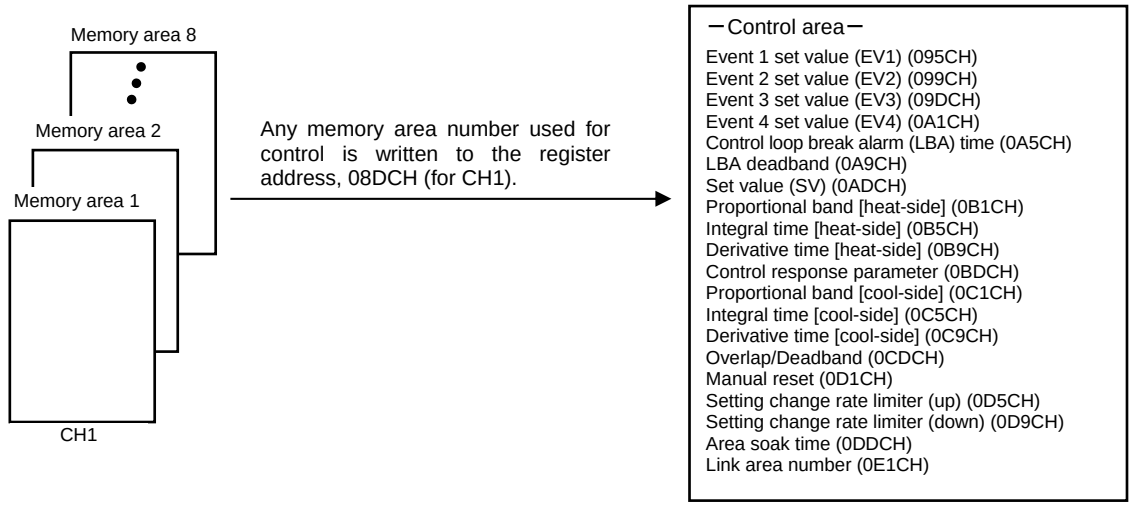
Any memory area used for control is specified by the Memory area transfer (08DCH to 091BH). The area (095CH to 0E5BH) now used for control is called Control area.

The Memory area number (Control area) can be changed at either RUN or STOP.

	Register address			
	CH1	CH2	·····	CH64
Memory area transfer	08DCH	08DDH	·····	091BH
Event 1 set value (EV1)	095CH	095DH	·····	099BH
Event 2 set value (EV2)	099CH	099DH	·····	09DBH
Event 3 set value (EV3)	09DCH	09DDH	·····	0A1BH
Event 4 set value (EV4)	0A1CH	0A1DH	·····	0A5BH
Control loop break alarm (LBA) time	0A5CH	0A5DH	·····	049BH
LBA deadband	0A9CH	0A9DH	·····	0ADBH
Set value (SV)	0ADCH	0ADDH	·····	0B1BH
Proportional band [heat-side]	0B1CH	0B1DH	·····	0B5BH
Integral time [heat-side]	0B5CH	0B5DH	·····	0B9BH
Derivative time [heat-side]	0B9CH	0B9DH	·····	0BDBH
Control response parameter	0BDCH	0BDDH	·····	0C1BH
Proportional band [cool-side]	0C1CH	0C1DH	·····	0C5BH
Integral time [cool-side]	0C5CH	0C5DH	·····	0C9BH
Derivative time [cool-side]	0C9CH	0C9DH	·····	0CDBH
Overlap/Deadband	0CDCH	0CDDH	·····	0CDCH
Manual reset	0D1CH	0D1DH	·····	0D5BH
Setting change rate limiter (up)	0D5CH	0D5DH	·····	0D9BH
Setting change rate limiter (down)	0D9CH	0D9DH	·····	0DDBH
Area soak time	0DDCH	0DDDH	·····	0E1BH
Link area number	0E1CH	0E1CH	·····	0E5BH

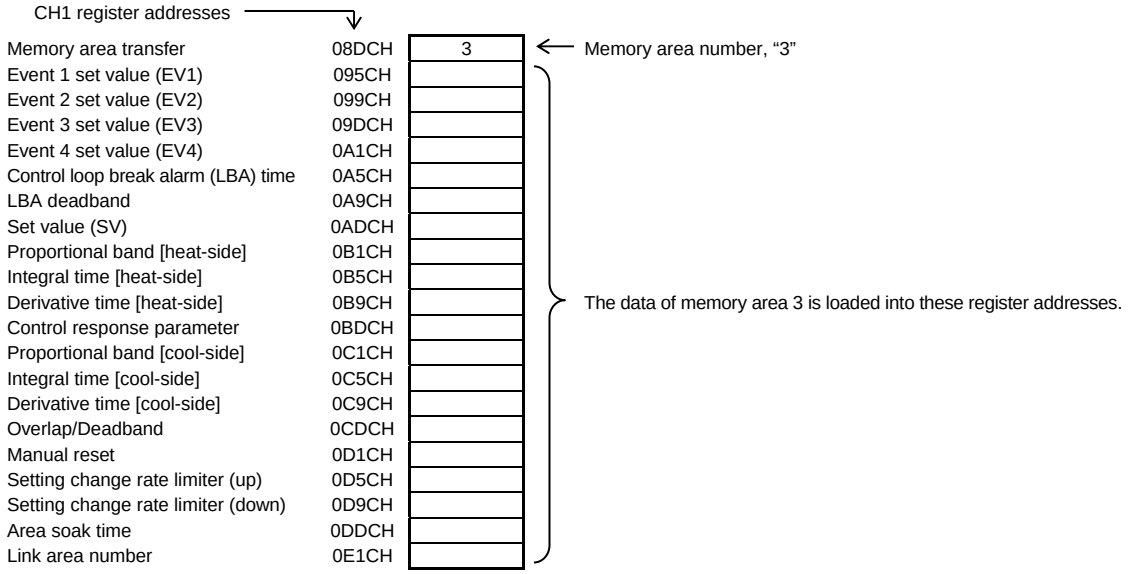
← Register address to specify Control area

Register address of memory area data



[Example] When performing control by calling up data in Memory area 3 of CH1

1. The Memory area number, "3" is written to the Memory area transfer (08DCH).
Data in Memory area 3 is called up to the CH1 register addresses.



2. Control of CH1 is performed by using data in the register addresses.

If the Memory area transfer (08DCH to 091BH) and the setting Memory area number (386CH to 38ABH) are set to the same Memory area number, the respective data can be synchronized.

- Values in the Control areas (095CH to 0E5BH) and the Setting memory area number (38ACH to 3DABH) are set to the same Memory area number, the respective data can be synchronized.
- If data in the Control area is changed, data in the memory area is also changed.
- If data in the memory area is changed, data in the Control area is also changed.

■ Data mapping function

When using a Z-COM module joined to function modules (Z-TIO, Z-DIO and Z-CT modules of SRZ), the data mapping function cannot be used.

For data mapping function, refer to the **SRZ Instruction Manual (IMS01T04-E□)**.

8. COMMUNICATION DATA LIST

8.1 Reference to Communication Data List

(1) (2) (3) (4) (5) (6) (7) (8) (9)

No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
1	Measured value (PV)	M1	CH1 : : CH64	01FC : : 023B	508 : : 571	7	RO	C	Input scale low to Input scale high	—

(1) Name: Communication data name

(2) Identifier: Communication identifier of RKC communication

(3) Channel: Channel number of data of one unit

(4) Register address: Register address of Modbus data item specification
(HEX: Hexadecimal DEC: Decimal)

(5) Digits: The number of communication data digits in RKC communication

(6) Attribute: A method of how communication data items are read or written when viewed from the host computer or PLC is described

RO: Read only data

R/W: Read and Write data

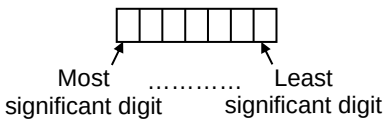
(7) Structure: C: Data for each channel [1, 2]
M: Data for each module
U: Data for each SRZ unit

[1] On a Z-TIO module (2-channel type), the communication data of the CH3 and CH4 becomes invalid.

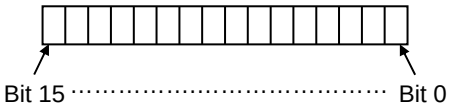
[2] Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data (indicated by ♣ in the name column) for CH2 and CH4 of Z-TIO modules are unused.
[Read is possible (0 is shown), but the result of Write is disregarded.]

(8) Data range: Read or write range of communication data

- ASCII code data (Example: 7 digits)



- 16-bit data (bit image)



(9) Factory set value: Factory set value of communication data

Some of the communication data of the Z-COM module will not be enabled until the power is turned on again, or control is switched from STOP to RUN.

Communication data No. 20 to 44

Communication data includes both Normal setting data and Engineering setting data. During RUN (control), the attribute of Engineering setting data is RO. To configure Engineering setting data, the RUN/STOP switch must be set to STOP (control stopped).

Z-TIO module: Normal setting data No. 1 to 85
Engineering setting data No. 86 to 208

Z-DIO module: Normal setting data No. 1 to 13
Engineering setting data No. 14 to 27

Z-CT module: Normal setting data No. 1 to 16
Engineering setting data No. 17 to 28 *

* No. 17 to 28: When the set lock (Identifier: LK, Resister address: 5E0CH to 5E1BH) is set to "0: Unlock," writing data is possible.

The Engineering setting data should be set according to the application before setting any parameter related to operation. Once the Engineering setting data are set correctly, no further changes need to be made to parameters for the same application under normal conditions. If they are changed unnecessarily, it may result in malfunction or failure of the instrument. RKC will not bear any responsibility for malfunction or failure as a result of improper changes in the Engineering setting.

Data mapping function
When using a Z-COM module joined to function modules (Z-TIO, Z-DIO and Z-CT modules), the data mapping function cannot be used.

For data mapping function, refer to the **SRZ Instruction Manual (IMS01T04-E□)**.

8.2 Communication Data of Z-COM Module

The communication data below is for PLC communication.

- No. 11 to 14, No. 16 and No. 43: System data (monitoring item) for PLC communication
- No. 28 to 36 and No. 38: System data (setting item) for PLC communication

☞ For details of Z-COM module communication data, refer to **9. COMMUNICATION DATA DESCRIPTION OF Z-COM MODULE (P. 97)**.

No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
1	Model code (Z-COM module)	ID	CH1	—	—	32	RO	M	Model code (character)	—
2	Model code (Function module)	IE	CH1 : CH100	—	—	32	RO	M	Model code (character)	—
3	ROM version (Z-COM module)	VR	CH1	—	—	8	RO	M	ROM version	—
4	ROM version (Function module)	VQ	CH1 : CH100	—	—	8	RO	M	ROM version	—
5	Integrated operating time monitor (Z-COM module)	UT	CH1	—	—	7	RO	M	0 to 19999 hours	—
6	Integrated operating time monitor (Function module)	UV	CH1 : CH100	—	—	7	RO	M	0 to 19999 hours	—
7	Error code (Z-COM module)	ER	CH1	0000	0	7	RO	U	• RKC communication 1: SRAM error [1]/ Adjustment data error [2] 2: Data back-up error [2] 4: A/D conversion error [2] 32: Logic output data error 64: Stack overflow [1] • Modbus Bit data Bit 0: SRAM error [1]/ Adjustment data error [2] Bit 1: Data back-up error [2] Bit 2: A/D conversion error [2] Bit 3: Unused Bit 4: Unused Bit 5: Logic output data error Bit 6: Stack overflow [1] Bit 7 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 127] The error condition is shown by the *OR* of each module. When multiple errors occur, the error No. is the sum value. [1] Only the Z-COM module [2] The error code of the Z-CT module is these three types.	—

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
8	Error code (Function module)	EZ	CH1 : CH100	0001 : 0064	1 : 100	7	RO	M	• RKC communication 1: Adjustment data error * 2: Data back-up error * 4: A/D conversion error * 32: Logic output data error • Modbus Bit data Bit 0: Adjustment data error * Bit 1: Data back-up error * Bit 2: A/D conversion error * Bit 3: Unused Bit 4: Unused Bit 5: Logic output data error Bit 6 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 63] When multiple errors occur, the error No. is the sum value. * The error code of the Z-CT module is these three types.	—
9	Backup memory state monitor (Z-COM module)	EM	CH1	0065	101	1	RO	M	0: The content of the backup memory does not coincide with that of the RAM. 1: The content of the backup memory coincides with that of the RAM.	—
10	Backup memory state monitor (Function module)	CZ	CH1 : CH100	0066 : 00C9	102 : 201	1	RO	M	0: The content of the backup memory does not coincide with that of the RAM. 1: The content of the backup memory coincides with that of the RAM.	—
11	System communication state	QM	CH1	00CA	202	1	RO	U	Bit data Bit 0: Data collection condition Bit 1 to Bit 15: Unused Data 0: Before data collection is completed 1: Data collection is completed [Decimal number: 0, 1]	—
12	SRZ normal communication flag	QL	CH1	00CB	203	1	RO	U	0/1 transfer (For communication checking) “0” and “1” are repeated for each communication period.	—
13	PLC communication error code	ES	CH1	00CC	204	7	RO	U	Bit data Bit 0: PLC register read/write error Bit 1: Slave communication timeout Bit 2: Unused Bit 3: Internal communication error Bit 4: Master communication timeout Bit 5 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 31]	—
14	Unit recognition flag	QN	CH1	00CD	205	7	RO	U	Bit data Bit 0: SRZ unit 1 Bit 1: SRZ unit 2 Bit 2: SRZ unit 3 Bit 3: SRZ unit 4 Bit 4 to Bit 15: Unused Data 0: No unit exists 1: Unit exists [Decimal number: 0 to 15]	—

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
15	Unused	—	—	00CE ⋮ 0131	206 ⋮ 305	—	—	—	—	—
16	Monitor for the number of connected modules	QK	CH1	0132	306	7	RO	U	0 to 31	—
17	RUN/STOP transfer [1] (Each unit)	SR	CH1	0133	307	1	R/W	U	0: STOP (Control stop) 1: RUN (Control start)	0
18	RUN/STOP transfer [2] (Each module)	SW	CH1 ⋮ CH100	0134 ⋮ 0197	308 ⋮ 407	1	R/W	M	0: STOP (Control stop) 1: RUN (Control start)	0
19	Control RUN/STOP holding setting [2] (Each module)	X1	CH1 ⋮ CH100	0198 ⋮ 01FB	408 ⋮ 507	1	R/W	M	0: Not holding (STOP start) 1: Holding (RUN/STOP hold)	1
The following items are enabled when the power is turned on again or when control is changed from STOP to RUN.										
20	Communication 1 protocol	VK	CH1	8000	32768	1	R/W	U	0: RKC communication 1: Modbus	0
21	Communication 1 communication speed	VL	CH1	8001	32769	1	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
22	Communication 1 data bit configuration	VM	CH1	8002	32770	7	R/W	U	0 to 5 Refer to **Table 1: Data bit configuration**	0
23	Communication 1 interval time	VN	CH1	8003	32771	7	R/W	U	0 to 250 ms	10
24	Communication 2 protocol	VP	CH1	8004	32772	1	R/W	U	0: RKC communication 1: Modbus 2: MITSUBISHI MELSEC series special protocol • A-compatible 1C frame (format 4) AnA/AnUCPU common command (QR/QW) [AnA, AnU, QnA, Q, FX3U or FX3UC series] • QnA-compatible 3C frame (format 4) command (0401/1401) The available register is only a ZR register. [QnA or Q series] 3: OMRON SYSMAC series special protocol 4: MITSUBISHI MELSEC series special protocol A-compatible 1C frame (format 4) ACPU common command (WR/WW) [A, FX2N, FX2NC, FX3U or FX3UC series] 5: YOKOGAWA FA-M3R special protocol	0

[1] When RUN/STOP transfer (Each unit) becomes STOP, the set lock (Identifier: LK, Resister address: 5E0CH to 5E1BH) of the Z-CT module becomes "0: Unlock."

[2] This item does not support a Z-CT module.

Table 1: Data bit configuration

Set value	Data bit	Parity bit	Stop bit	Settable communication
0	8	Without	1	Modbus RKC communication PLC communication
1	8	Even	1	
2	8	Odd	1	
3	7	Without	1	RKC communication PLC communication
4	7	Even	1	
5	7	Odd	1	
6	8	Without	2	PLC communication
7	8	Even	2	
8	8	Odd	2	
9	7	Without	2	
10	7	Even	2	
11	7	Odd	2	

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No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
25	Communication 2 communication speed	VU	CH1	8005	32773	1	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
26	Communication 2 data bit configuration	VW	CH1	8006	32774	7	R/W	U	0 to 11 Refer to **Table 1: Data bit configuration (P. 61)**	0
27	Communication 2 interval time	VX	CH1	8007	32775	7	R/W	U	0 to 250 ms	10
28	Station number	QV	CH1	8008	32776	7	R/W	U	0 to 31: MITSUBISHI MELSEC series and OMRON SYSMAC series 1 to 31: YOKOGAWA FA-M3R	MITSUBISHI PLC, OMRON PLC: 0 YOKOGAWA PLC: 1
29	PC number (CPU No.)	QW	CH1	8009	32777	7	R/W	U	0 to 255: MITSUBISHI MELSEC Series. 1 to4: YOKOGAWA FA-M3R (OMRON SYSMAC series: Unused)	MITSUBISHI PLC: 255 YOKOGAWA PLC: 1
30	Register type	QZ	CH1	800A	32778	7	R/W	U	MITSUBISHI MELSEC series 0: D register (Data register) 1: R register (File register) 2: W register (Link register) 3: ZR register (Method of specifying consecutive numbers when 32767 of R register is exceeded.) Only enabled when the "QnA-compatible 3C frame (format 4)" is used. 4 to 29: Unused --- OMRON SYSMAC series 0: DM register (Data memory) 1 to 9: Unused 10 to 22: EM register (Extended data memory) [Specify the bank No.] Set the bank No.+10. 23 to 28: Unused 29: EM register (Extended data memory) [Specify the current bank] --- YOKOGAWA FA-M3R 0: D register (Data register) 1: R register (Shared register) 2: W register (Link register) 3: Unused 4: B register (File register) 5 to 29: Unused	0
31	Register start number (High-order 4-bit)	QS	CH1	800B	32779	7	R/W	U	0 to 15: QnA-compatible 3C frame	0
32	Register start number (Low-order 16-bit)	QX	CH1	800C	32780	7	R/W	U	0 to 9999: A-compatible 1C frame (format 4) ACPU common command (WR/WW), OMRON SYSMAC series 0 to 65535: A-compatible 1C frame (format 4) AnA/AnUCPU common command (QR/QW), QnA-compatible 3C frame (format 4) command (0401/1401) and YOKOGAWA FA-M3R	1000

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No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
33	System data address bias	QQ	CH1	800D	32781	7	R/W	U	0 to 9999 OMRON SYSMAC series 0 to 65535 MITSUBISHI MELSEC series and YOKOGAWA FA-M3R	2100
34	COM module link recognition time	QT	CH1	800E	32782	7	R/W	U	0 to 255 seconds	10
35	PLC scanning time	VT	CH1	800F	32783	7	R/W	U	0 to 3000 ms	255
36	PLC communication start time	R5	CH1	8010	32784	7	R/W	U	1 to 255 seconds	5
37	Method for setting the number of connected modules	RY	CH1	8011	32785	7	R/W	U	0: No action 1: Automatically set the maximum number of connected function modules only when power is turned on. 2: Execute automatic setting of the maximum number of connected function modules. (After automatic setting of the number of connected function modules, the value automatically reverts to 0.)	1
38	Slave mapping method	RK	CH1	8012	32786	7	R/W	U	0: Bias from the address setting switch [Register address + (Address setting switch coefficient × System data address bias)] 1: Bias disabled	0
39	Number of connected modules * (Z-TIO module)	QY	CH1	8013	32787	7	R/W	U	0 to 16 This is the maximum address of the Z-TIO module that is connected to the Z-COM module.	—
40	Number of connected modules * (Z-DIO module)	QU	CH1	8014	32788	7	R/W	U	0 to 16 This is the maximum address of the Z-DIO module that is connected to the Z-COM module.	—
41	Number of connected modules * (Z-CT module)	QO	CH1	8015	32789	7	R/W	U	0 to 16 This is the maximum address of the Z-CT module that is connected to the Z-COM module.	—
42	Unused	—	—	8016 ⋮ 8019	32790 ⋮ 32793	—	—	—	—	—
43	Number of valid groups	QA	CH1	801A	32794	7	RO	U	0 to 128	—
44	Control RUN/STOP holding setting (Each unit)	X2	CH1	801B	32795	1	R/W	U	0: Not holding (STOP start) 1: Holding (RUN/STOP hold)	1

* When 1 or 2 is set for the communication identifier RY (method of setting the number of connected modules), the maximum number of connected modules is set automatically. When 0 is set, the maximum number of connected modules is set manually.

Maximum number of connected modules: Maximum address of function modules (address setting switch set value + 1)

Z-COM uses this set value to calculate the number of channels of communication data (RKC communication only).

8.3 Communication Data of Z-TIO Module

☞ For details of Z-TIO module communication data, refer to **SRZ Instruction Manual (IMS01T04-E□)**.

No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
1	Measured value (PV)	M1	CH1 : CH64	01FC : 023B	508 : 571	7	RO	C	Input scale low to Input scale high	—
2	Comprehensive event state	AJ	CH1 : CH64	023C : 027B	572 : 635	7	RO	C	• RKC communication Least significant digit: Event 1 2nd digit: Event 2 3rd digit: Event 3 4th digit: Event 4 5th digit: Heater break alarm (HBA) 6th digit: Temperature rise completion 7th digit: Burnout Data 0: OFF 1: ON • Modbus Bit data Bit 0: Event 1 Bit 1: Event 2 Bit 2: Event 3 Bit 3: Event 4 Bit 4: Heater break alarm (HBA) Bit 5: Temperature rise completion Bit 6: Burnout Bit 7 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 127]	—
3	Operation mode state monitor	L0	CH1 : CH64	027C : 02BB	636 : 699	7	RO	C	• RKC communication Least significant digit: STOP 2nd digit: RUN 3rd digit: Manual mode 4th digit: Remote mode 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit data Bit 0: STOP Bit 1: RUN Bit 2: Manual mode Bit 3: Remote mode Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15]	—
4	Unused	—	—	02BC : 02CB	700 : 715	—	—	—	—	—
5	Manipulated output value (MV) monitor [heat-side] ♣	O1	CH1 : CH64	02CC : 030B	716 : 779	7	RO	C	PID control or Heat/Cool PID control: −5.0 to +105.0 % Position proportioning PID control with feedback resistance (FBR) input: 0.0 to 100.0 %	—
6	Manipulated output value (MV) monitor [cool-side] ♣	O2	CH1 : CH64	030C : 034B	780 : 843	7	RO	C	−5.0 to +105.0 %	—

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
7	Current transformer (CT) input value monitor	M3	CH1 : CH64	034C : 038B	844 : 907	7	RO	C	CTL-6-P-N: 0.0 to 30.0 A CTL-12-S56-10L-N: 0.0 to 100.0 A	—
8	Set value (SV) monitor	MS	CH1 : CH64	038C : 03CB	908 : 971	7	RO	C	Setting limiter low to Setting limiter high	—
9	Remote setting (RS) input value monitor	S2	CH1 : CH64	03CC : 040B	972 : 1035	7	RO	C	Setting limiter low to Setting limiter high	—
10	Burnout state monitor	B1	CH1 : CH64	040C : 044B	1036 : 1099	1	RO	C	0: OFF 1: ON	—
11	Event 1 state monitor	AA	CH1 : CH64	044C : 048B	1100 : 1163	1	RO	C	0: OFF 1: ON If the Event 3 type is Temperature rise completion, check the Temperature rise completion state in the Comprehensive event state (Identifier: AJ, Register address: 023CH to 027BH). (The Event 3 state monitor does not turn ON.)	—
12	Event 2 state monitor	AB	CH1 : CH64	048C : 04CB	1164 : 1227	1	RO	C		—
13	Event 3 state monitor	AC	CH1 : CH64	04CC : 050B	1228 : 1291	1	RO	C		—
14	Event 4 state monitor	AD	CH1 : CH64	050C : 054B	1292 : 1355	1	RO	C		—
15	Heater break alarm (HBA) state monitor	AE	CH1 : CH64	054C : 058B	1356 : 1419	1	RO	C	0: OFF 1: ON	—
16	Output state monitor	Q1	CH1 : CH16	058C : 059B	1420 : 1435	7	RO	M	• RKC communication Least significant digit: OUT1 2nd digit: OUT2 3rd digit: OUT3 4th digit: OUT4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit data Bit 0: OUT1 Bit 1: OUT2 Bit 2: OUT3 Bit 3: OUT4 Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] Valid only for time-proportional control output.	—
17	Memory area soak time monitor	TR	CH1 : CH64	059C : 05DB	1436 : 1499	7	RO	C	0 minutes 00 seconds to 199 minutes 59 seconds: RKC communication: 0:00 to 199:59 (min:sec) Modbus: 0 to 11999 seconds 0 hours 00 minutes to 99 hours 59 minutes: RKC communication: 0:00 to 99:59 (hrs:min) Modbus: 0 to 5999 minutes Data range of Area soak time can be selected on the Soak time unit.	—

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
18	Unused	—	—	05DC ⋮ 05EB	1500 ⋮ 1515	—	—	—	—	—
19	Holding peak value ambient temperature monitor	Hp	CH1 ⋮ CH64	05EC ⋮ 062B	1516 ⋮ 1579	7	RO	C	–10.0 to +100.0 °C (14.0 to 212.0 °F)	—
20	Unused	—	—	062C ⋮ 063B	1580 ⋮ 1595	—	—	—	—	—
21	Logic output monitor 1	ED	CH1 ⋮ CH16	063C ⋮ 064B	1596 ⋮ 1611	7	RO	M	• RKC communication Least significant digit: Logic output 1 2nd digit: Logic output 2 3rd digit: Logic output 3 4th digit: Logic output 4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit data Bit 0: Logic output 1 Bit 1: Logic output 2 Bit 2: Logic output 3 Bit 3: Logic output 4 Bit 4: Logic output 5 Bit 5: Logic output 6 Bit 6: Logic output 7 Bit 7: Logic output 8 Bit 8 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255]	—
22	Logic output monitor 2	EE	CH1 ⋮ CH16	—	—	7	RO	M	Least significant digit: Logic output 5 2nd digit: Logic output 6 3rd digit: Logic output 7 4th digit: Logic output 8 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	
23	Unused	—	—	064C ⋮ 080B	1612 ⋮ 2059	—	—	—	—	—
24	PID/AT transfer	G1	CH1 ⋮ CH64	080C ⋮ 084B	2060 ⋮ 2123	1	R/W	C	0: PID control 1: Autotuning (AT) When the Autotuning (AT) is finished, the control will automatically returns to 0: PID control.	0
25	Auto/Manual transfer	J1	CH1 ⋮ CH64	084C ⋮ 088B	2124 ⋮ 2187	1	R/W	C	0: Auto mode 1: Manual mode	0
26	Remote/Local transfer	C1	CH1 ⋮ CH64	088C ⋮ 08CB	2188 ⋮ 2251	1	R/W	C	0: Local mode 1: Remote mode When performing remote control by remote setting input and also performing cascade control and ratio setting, transfer to the Remote mode.	0
27	Unused	—	—	08CC ⋮ 08DB	2252 ⋮ 2267	—	—	—	—	—
28	Memory area transfer	ZA	CH1 ⋮ CH64	08DC ⋮ 091B	2268 ⋮ 2331	7	R/W	C	1 to 8	1

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
29	Interlock release	AR	CH1 : CH64	091C : 095B	2332 : 2395	1	R/W	C	0: Normal state 1: Interlock release execution	0
30	Event 1 set value (EV1) ★	A1	CH1 : CH64	095C : 099B	2396 : 2459	7	R/W	C	Deviation action, Deviation action between channels, Temperature rise completion range: –Input span to +Input span Varies with the setting of the decimal point position. Process action, SV action: Input scale low to Input scale high Varies with the setting of the decimal point position. MV action: –5.0 to +105.0 % If the Event type corresponds to "0: None," set to RO (Only reading data is possible). If Event 3 corresponds to "9: Temperature rise completion," the Event 3 set value becomes the range for determining temperature rise completion. If Event 4 corresponds to "9: Control loop break alarm (LBA)," the Event 4 set value becomes RO (Only reading data is possible).	50
31	Event 2 set value (EV2) ★	A2	CH1 : CH64	099C : 09DB	2460 : 2523	7	R/W	C		50
32	Event 3 set value (EV3) ★	A3	CH1 : CH64	09DC : 0A1B	2524 : 2587	7	R/W	C		50
33	Event 4 set value (EV4) ★	A4	CH1 : CH64	0A1C : 0A5B	2588 : 2651	7	R/W	C		50
34	Control loop break alarm (LBA) time ★	A5	CH1 : CH64	0A5C : 0A9B	2652 : 2715	7	R/W	C	0 to 7200 seconds (0: Unused)	480
35	LBA deadband ★	N1	CH1 : CH64	0A9C : 0ADB	2716 : 2779	7	R/W	C	0 (0.0) to Input span Varies with the setting of the decimal point position.	0 (0.0)
36	Set value (SV) ★	S1	CH1 : CH64	0ADC : 0B1B	2780 : 2843	7	R/W	C	Setting limiter low to Setting limiter high	TC/RTD: 0 V/I: 0.0
37	Proportional band [heat-side] ★ ♣	P1	CH1 : CH64	0B1C : 0B5B	2844 : 2907	7	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.0 to 1000.0 % of input span 0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a Heat/Cool PID control type.)	TC/RTD: 30 (30.0) V/I: 30.0
38	Integral time [heat-side] ★ ♣	I1	CH1 : CH64	0B5C : 0B9B	2908 : 2971	7	R/W	C	PID control or Heat/Cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Position proportioning PID control: 1 to 3600 seconds or 0.1 to 1999.9 seconds Varies with the setting of the Integral/ Derivative time decimal point position.	240
39	Derivative time [heat-side] ★ ♣	D1	CH1 : CH64	0B9C : 0BDB	2972 : 3035	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Varies with the setting of the Integral/ Derivative time decimal point position.	60

★ Parameters which can be used in multi-memory area function

♣ Parameters only used for Heat/Cool PID control or Pposition proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

Continued on the next page.

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
40	Control response parameter ★ ♣	CA	CH1 : CH64	0BDC : 0C1B	3036 : 3099	1	R/W	C	0: Slow 1: Medium 2: Fast When the P or PD action is selected, this setting becomes invalid.	PID control, Position proportioning PID control: 0 Heat/Cool PID control: 2
41	Proportional band [cool-side] ★ ♣	P2	CH1 : CH64	0C1C : 0C5B	3100 : 3163	7	R/W	C	TC/RTD inputs: 1 (0.1) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.1 to 1000.0 % of input span If control is other than Heat/Cool PID control, set to RO (Only reading data is possible).	TC/RTD: 30 (30.0) V/I: 30.0
42	Integral time [cool-side] ★ ♣	I2	CH1 : CH64	0C5C : 0C9B	3164 : 3227	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Varies with the setting of the Integral/Derivative time decimal point position. If control is other than Heat/Cool PID control, set to RO (Only reading data is possible).	240
43	Derivative time [cool-side] ★ ♣	D2	CH1 : CH64	0C9C : 0CDB	3228 : 3291	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Varies with the setting of the Integral/Derivative time decimal point position. If control is other than Heat/Cool PID control, set to RO (Only reading data is possible).	60
44	Overlap/Deadband ★ ♣	V1	CH1 : CH64	0CDC : 0D1B	3292 : 3355	7	R/W	C	TC/RTD inputs: –Input span to +Input span (Unit:°C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: –100.0 to +100.0 % of input span Minus (–) setting results in overlap. However, the overlapping range is within the proportional range. If control is other than Heat/Cool PID control, set to RO (Only reading data is possible).	0
45	Manual reset ★	MR	CH1 : CH64	0D1C : 0D5B	3356 : 3419	7	R/W	C	–100.0 to +100.0 % If the integral function is valid, set to RO (Only reading data is possible). When integral action (heating or cooling side) is zero, manual reset value is added to the control output.	0.0
46	Setting change rate limiter (up) ★	HH	CH1 : CH64	0D5C : 0D9B	3420 : 3483	7	R/W	C	0 (0.0) to Input span/unit time * 0 (0.0): Unused Varies with the setting of the decimal point position. * Unit time: 60 seconds (factory set value)	0 (0.0)
47	Setting change rate limiter (down) ★	HL	CH1 : CH64	0D9C : 0DDB	3484 : 3547	7	R/W	C		0 (0.0)

★ Parameters which can be used in multi-memory area function

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

Continued on the next page.

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
48	Area soak time ★	TM	CH1 : CH64	0DDC : 0E1B	3548 : 3611	7	R/W	C	0 minutes 00 seconds to 199 minutes 59 seconds: RKC communication: 0:00 to 199:59 (min:sec) Modbus: 0 to 11999 seconds 0 hours 00 minutes to 99 hours 59 minutes: RKC communication: 0:00 to 99:59 (hrs:min) Modbus: 0 to 5999 minutes Data range of Area soak time can be selected on the Soak time unit.	RKC communication: 0:00 Modbus: 0
49	Link area number ★	LP	CH1 : CH64	0E1C : 0E5B	3612 : 3675	7	R/W	C	0 to 8 (0: No link)	0
50	Heater break alarm (HBA) set value	A7	CH1 : CH64	0E5C : 0E9B	3676 : 3739	7	R/W	C	When CT is CTL-6-P-N: 0.0 to 30.0 A (0.0: Not used) When CT is CTL-12-S56-10L-N: 0.0 to 100.0 A (0.0: Not used) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible).	0.0
51	Heater break determination point	NE	CH1 : CH64	0E9C : 0EDB	3740 : 3803	7	R/W	C	0.0 to 100.0 % of HBA set value (0.0: Heater break determination is invalid) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible). If Heater break alarm (HBA) corresponds to "0: Type A," set to RO (Only reading data is possible).	30.0
52	Heater melting determination point	NF	CH1 : CH64	0EDC : 0F1B	3804 : 3867	7	R/W	C	0.0 to 100.0 % of HBA set value (0.0: Heater melting determination is invalid) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible). If Heater break alarm (HBA) corresponds to "0: Type A," set to RO (Only reading data is possible).	30.0
53	PV bias	PB	CH1 : CH64	0F1C : 0F5B	3868 : 3931	7	R/W	C	–Input span to +Input span Varies with the setting of the decimal point position.	0
54	PV digital filter	F1	CH1 : CH64	0F5C : 0F9B	3932 : 3995	7	R/W	C	0.0 to 100.0 seconds (0.0: Unused)	0.0
55	PV ratio	PR	CH1 : CH64	0F9C : 0FDB	3996 : 4059	7	R/W	C	0.500 to 1.500	1.000
56	PV low input cut-off	DP	CH1 : CH64	0FDC : 101B	4060 : 4123	7	R/W	C	0.00 to 25.00 % of input span If the Square root extraction corresponds to "0: Unused," set to RO (Only reading data is possible).	0.00
57	RS bias *	RB	CH1 : CH64	101C : 105B	4124 : 4187	7	R/W	C	–Input span to +Input span Varies with the setting of the decimal point position.	0
58	RS digital filter *	F2	CH1 : CH64	105C : 109B	4188 : 4251	7	R/W	C	0.0 to 100.0 seconds (0.0: Unused)	0.0

* Data on RS bias, RS ratio and RS digital filter is that in cascade control or ratio setting.

★ Parameters which can be used in multi-memory area function

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No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
59	RS ratio *	RR	CH1 : CH64	109C : 10DB	4252 : 4315	7	R/W	C	0.001 to 9.999	1.000
60	Output distribution selection	DV	CH1 : CH64	10DC : 111B	4316 : 4379	1	R/W	C	0: Control output 1: Distribution output	0
61	Output distribution bias	DW	CH1 : CH64	111C : 115B	4380 : 4443	7	R/W	C	–100.0 to +100.0 %	0.0
62	Output distribution ratio	DQ	CH1 : CH64	115C : 119B	4444 : 4507	7	R/W	C	–9.999 to +9.999	1.000
63	Proportional cycle time	T0	CH1 : CH64	119C : 11DB	4508 : 4571	7	R/W	C	0.1 to 100.0 seconds This item becomes RO (Only reading data is possible) for the Voltage/Current output specification. This parameter is valid when “0: control output” has been selected at No.95 “Output assignment.”	Relay contact output: 20.0 Voltage pulse output, triac output and open collector output: 2.0
64	Minimum ON/OFF time of proportioning cycle	VI	CH1 : CH64	11DC : 121B	4572 : 4635	7	R/W	C	0 to 1000 ms This item becomes RO (Only reading data is possible) for the Voltage/Current output specification.	0
65	Manual manipulated output value ♣	ON	CH1 : CH64	121C : 125B	4636 : 4699	7	R/W	C	PID control: Output limiter low to Output limiter high Heat/Cool PID control: –Cool-side output limiter (high) to +Heat-side output limiter (high) Position proportioning PID control: When there is feedback resistance (FBR) input and it does not break: Output limiter low to Output limiter high When there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected: 0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON	0.0
66	Area soak time stop function	RV	CH1 : CH64	125C : 129B	4700 : 4763	1	R/W	C	0: No function 1: Event 1 2: Event 2 3: Event 3 4: Event 4	0
67	EDS mode (for disturbance 1)	NG	CH1 : CH64	129C : 12DB	4764 : 4827	1	R/W	C	0: No function 1: EDS function mode 2: Learning mode 3: Tuning mode EDS function: External disturbance suppression function	0
68	EDS mode (for disturbance 2)	NX	CH1 : CH64	12DC : 131B	4828 : 4891	1	R/W	C		0

* Data on RS bias, RS ratio and RS digital filter is that in cascade control or ratio setting.

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

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No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
69	EDS value 1 (for disturbance 1)	NI	CH1 ⋮ CH64	131C ⋮ 135B	4892 ⋮ 4955	7	R/W	C	−100.0 to +100.0 %	0.0
70	EDS value 1 (for disturbance 2)	NJ	CH1 ⋮ CH64	135C ⋮ 139B	4956 ⋮ 5019	7	R/W	C		0.0
71	EDS value 2 (for disturbance 1)	NK	CH1 ⋮ CH64	139C ⋮ 13DB	5020 ⋮ 5083	7	R/W	C	−100.0 to +100.0 %	0.0
72	EDS value 2 (for disturbance 2)	NM	CH1 ⋮ CH64	13DC ⋮ 141B	5084 ⋮ 5147	7	R/W	C		0.0
73	EDS transfer time (for disturbance 1)	NN	CH1 ⋮ CH64	141C ⋮ 145B	5148 ⋮ 5211	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds	0
74	EDS transfer time (for disturbance 2)	NO	CH1 ⋮ CH64	145C ⋮ 149B	5212 ⋮ 5275	7	R/W	C		0
75	EDS action time (for disturbance 1)	NQ	CH1 ⋮ CH64	149C ⋮ 14DB	5276 ⋮ 5339	7	R/W	C	1 to 3600 seconds	600
76	EDS action time (for disturbance 2)	NL	CH1 ⋮ CH64	14DC ⋮ 151B	5340 ⋮ 5403	7	R/W	C	1 to 3600 seconds	600
77	EDS action wait time (for disturbance 1)	NR	CH1 ⋮ CH64	151C ⋮ 155B	5404 ⋮ 5467	7	R/W	C	0.0 to 600.0 seconds	0.0
78	EDS action wait time (for disturbance 2)	NY	CH1 ⋮ CH64	155C ⋮ 159B	5468 ⋮ 5531	7	R/W	C		0.0
79	EDS value learning times	NT	CH1 ⋮ CH64	159C ⋮ 15DB	5532 ⋮ 5595	7	R/W	C	0 to 10 times (0: No learning mode)	1
80	EDS start signal	NU	CH1 ⋮ CH64	15DC ⋮ 161B	5596 ⋮ 5659	1	R/W	C	0: EDS start signal OFF 1: EDS start signal ON (for disturbance 1) 2: EDS start signal ON (for disturbance 2)	0
81	Operation mode	EI	CH1 ⋮ CH64	161C ⋮ 165B	5660 ⋮ 5723	1	R/W	C	0: Unused 1: Monitor 2: Monitor + Event function 3: Control	3
82	Startup tuning (ST)	ST	CH1 ⋮ CH64	165C ⋮ 169B	5724 ⋮ 5787	1	R/W	C	0: ST unused 1: Execute once * 2: Execute always * When the Startup tuning (ST) is finished, the setting will automatically returns to "0: ST unused." The Startup tuning (ST) function is activated according to the ST start condition selected. If control is Position proportioning PID control, set to RO (Only reading data is possible).	0
83	Automatic temperature rise learning	Y8	CH1 ⋮ CH64	169C ⋮ 16DB	5788 ⋮ 5851	1	R/W	C	0: Unused 1: Learning * * When the automatic temperature rise learning is finished, the setting will automatically returns to "0: Unused."	0

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
84	Communication switch for logic	EF	CH1 : CH16	16DC : 16EB	5852 : 5867	7	R/W	M	• RKC communication Least significant digit: Communication switch 1 2nd digit: Communication switch 2 3rd digit: Communication switch 3 4th digit: Communication switch 4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit data Bit 0: Communication switch 1 Bit 1: Communication switch 2 Bit 2: Communication switch 3 Bit 3: Communication switch 4 Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15]	0
85	Unused	—	—	16EC : 196B	5868 : 6507	—	—	—	—	—
Set data No. 86 or later are for engineering setting [Writable in the STOP mode]										
86	Input type	XI	CH1 : CH64	196C : 19AB	6508 : 6571	7	R/W	C	0: TC input K 1: TC input J 2: TC input R 3: TC input S 4: TC input B 5: TC input E 6: TC input N 7: TC input T 8: TC input W5Re/W26Re 9: TC input PLII 12: RTD input Pt100 13: RTD input JPt100 14: Current input 0 to 20 mA DC 15: Current input 4 to 20 mA DC 16: Voltage (high) input 0 to 10 V DC 17: Voltage (high) input 0 to 5 V DC 18: Voltage (high) input 1 to 5 V DC 19: Voltage (low) input 0 to 1 V DC 20: Voltage (low) input 0 to 100 mV DC 21: Voltage (low) input 0 to 10 mV DC 22: Feedback resistance input 100 to 150 Ω 23: Feedback resistance input 151 Ω to 6 kΩ If changed to Voltage (high) input from TC/RTD/Current/Voltage (low)/ Feedback resistance input, select the hardware by the input selector switch at the side of the module. Refer to **SRZ Instruction Manual (IMS01T04-E□)**.	Based on model code When not specifying: 0
87	Display unit	PU	CH1 : CH64	19AC : 19EB	6572 : 6635	7	R/W	C	0: °C 1: °F Use to select the temperature unit for thermocouple (TC) and RTD inputs.	Based on model code When not specifying: 0

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
88	Decimal point position	XU	CH1 : CH64	19EC : 1A2B	6636 : 6699	7	R/W	C	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places TC input: • K, J, T, E: Only 0 or 1 can be set. • R, S, B, N, PLII, W5Re/W26Re: Only 0 can be set. RTD input: Only 0 or 1 can be set. Voltage (V)/Current (I) inputs: From 0 to 4 can be set.	Based on model code When not specifying: TC/RTD: 1 V/I: 1
89	Input scale high	XV	CH1 : CH64	1A2C : 1A6B	6700 : 6763	7	R/W	C	TC/RTD inputs: Input scale low to Maximum value of the selected input range Voltage (V)/Current (I) inputs: –19999 to +19999 (However, a span is 20000 or less.) Varies with the setting of the decimal point position.	TC/RTD: Maximum value of the selected input range V/I: 100.0
90	Input scale low	XW	CH1 : CH64	1A6C : 1AAB	6764 : 6827	7	R/W	C	TC/RTD inputs: Minimum value of the selected input range to Input scale high Voltage (V)/Current (I) inputs: –19999 to +19999 (However, a span is 20000 or less.) Varies with the setting of the decimal point position.	TC/RTD: Minimum value of the selected input range V/I: 0.0
91	Input error determination point (high)	AV	CH1 : CH64	1AAC : 1AEB	6828 : 6891	7	R/W	C	Input error determination point (low) to (Input range high + 5 % of Input span) Varies with the setting of the decimal point position.	Input range high + (5 % of Input span)
92	Input error determination point (low)	AW	CH1 : CH64	1AEC : 1B2B	6892 : 6955	7	R/W	C	(Input range low – 5 % of Input span) to Input error determination point (high) Varies with the setting of the decimal point position.	Input range low – (5 % of Input span)
93	Burnout direction	BS	CH1 : CH64	1B2C : 1B6B	6956 : 7019	1	R/W	C	0: Upscale 1: Downscale Valid only when the TC input and voltage (low) input are selected.	0
94	Square root extraction	XH	CH1 : CH64	1B6C : 1BAB	7020 : 7083	1	R/W	C	0: Unused 1: Used	0
95	Output assignment (Logic output selection function)	E0	CH1 : CH64	1BAC : 1BEB	7084 : 7147	1	R/W	C	0: Control output 1: Logic output result 2: FAIL output	0
96	Energized/ De-energized (Logic output selection function)	NA	CH1 : CH64	1BEC : 1C2B	7148 : 7211	1	R/W	C	0: Energized 1: De-energized	0

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
97	Event 1 type	XA	CH1 : CH64	1C2C : 1C6B	7212 : 7275	7	R/W	C	0: None 1: Deviation high (Using SV monitor value) [1] 2: Deviation low (Using SV monitor value) [1] 3: Deviation high/low (Using SV monitor value) [1] 4: Band (Using SV monitor value) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Unused 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Using local SV value) [1] 15: Deviation low (Using local SV value) [1] 16: Deviation high/low (Using local SV value) [1] 17: Band (Using local SV value) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in Position proportioning PID control, set to the feedback resistance (FBR) input value.	Based on model code When not specifying: 0
98	Event 1 channel setting	FA	CH1 : CH64	1C6C : 1CAB	7276 : 7339	1	R/W	C	1: Channel 1 3: Channel 3 2: Channel 2 4: Channel 4 This function is valid when “deviation between channels”is selected.	1
99	Event 1 hold action	WA	CH1 : CH64	1CAC : 1CEB	7340 : 7403	1	R/W	C	0: OFF 1: Hold action ON (when power turned on; when transferred from STOP to RUN) 2: Re-hold action ON (when power turned on; when transferred from STOP to RUN; SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Based on model code When not specifying: 0
100	Event 1 interlock	LF	CH1 : CH64	1CEC : 1D2B	7404 : 7467	1	R/W	C	0: Unused 1: Used	0
101	Event 1 differential gap	HA	CH1 : CH64	1D2C : 1D6B	7468 : 7531	7	R/W	C	① Deviation, process, set value, or Deviation action between channels: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. ② MV: 0.0 to 110.0 %	①: 1 ②: 1.0
102	Event 1 delay timer	TD	CH1 : CH64	1D6C : 1DAB	7532 : 7595	7	R/W	C	0 to 18000 seconds	0

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Continued from the previous page.

No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
103	Force ON of Event 1 action	OA	CH1 : CH64	1DAC : 1DEB	7596 : 7659	7	R/W	C	• RKC communication Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the Autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalidate 1: Validate • Modbus Bit data Bit 0: Event output turned on at input error occurrence Bit 1: Event output turned on in manual mode Bit 2: Event output turned on during the Autotuning (AT) function is being executed Bit 3: Event output turned on during the setting change rate limiter is being operated Bit 4 to Bit 15: Unused Data 0: Invalidate 1: Validate [Decimal number: 0 to 15]	0
104	Event 2 type	XB	CH1 : CH64	1DEC : 1E2B	7660 : 7723	7	R/W	C	0: None 1: Deviation high (Using SV monitor value) [1] 2: Deviation low (Using SV monitor value) [1] 3: Deviation high/low (Using SV monitor value) [1] 4: Band (Using SV monitor value) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Unused 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Using local SV value) [1] 15: Deviation low (Using local SV value) [1] 16: Deviation high/low (Using local SV value) [1] 17: Band (Using local SV value) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in Position proportioning PID control, set to the feedback resistance (FBR) input value.	Based on model code When not specifying: 0

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
105	Event 2 channel setting	FB	CH1 : CH64	1E2C : 1E6B	7724 : 7787	1	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "deviation between channels"is selected.	1
106	Event 2 hold action	WB	CH1 : CH64	1E6C : 1EAB	7788 : 7851	1	R/W	C	0: OFF 1: Hold action ON (when power turned on; when transferred from STOP to RUN) 2: Re-hold action ON (when power turned on; when transferred from STOP to RUN; SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Based on model code When not specifying: 0
107	Event 2 interlock	LG	CH1 : CH64	1EAC : 1EEB	7852 : 7915	1	R/W	C	0: Unused 1: Used	0
108	Event 2 differential gap	HB	CH1 : CH64	1EEC : 1F2B	7916 : 7979	7	R/W	C	① Deviation, process, set value, or Deviation action between channels: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. ② MV: 0.0 to 110.0 %	①: 1 ②: 1.0
109	Event 2 delay timer	TG	CH1 : CH64	1F2C : 1F6B	7980 : 8043	7	R/W	C	0 to 18000 seconds	0
110	Force ON of Event 2 action	OB	CH1 : CH64	1F6C : 1FAB	8044 : 8107	7	R/W	C	• RKC communication Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the Autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalidate 1: Validate • Modbus Bit data Bit 0: Event output turned on at input error occurrence Bit 1: Event output turned on in manual mode Bit 2: Event output turned on during the Autotuning (AT) function is being executed Bit 3: Event output turned on during the setting change rate limiter is being operated Bit 4 to Bit 15: Unused Data 0: Invalidate 1: Validate [Decimal number: 0 to 15]	0

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
111	Event 3 type	XC	CH1 : CH64	1FAC : 1FEB	8108 : 8171	7	R/W	C	0: None 1: Deviation high (Using SV monitor value) [1] 2: Deviation low (Using SV monitor value) [1] 3: Deviation high/low (Using SV monitor value) [1] 4: Band (Using SV monitor value) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Temperature rise completion 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Using local SV value) [1] 15: Deviation low (Using local SV value) [1] 16: Deviation high/low (Using local SV value) [1] 17: Band (Using local SV value) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in Position proportioning PID control, set to the feedback resistance (FBR) input value.	Based on model code When not specifying: 0
112	Event 3 channel setting	FC	CH1 : CH64	1FEC : 202B	8172 : 8235	1	R/W	C	1: Channel 1 3: Channel 3 2: Channel 2 4: Channel 4 This function is valid when "deviation between channels"is selected.	1
113	Event 3 hold action	WC	CH1 : CH64	202C : 206B	8236 : 8299	1	R/W	C	0: OFF 1: Hold action ON (when power turned on; when transferred from STOP to RUN) 2: Re-hold action ON (when power turned on; when transferred from STOP to RUN SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Based on model code When not specifying: 0
114	Event 3 interlock	LH	CH1 : CH64	206C : 20AB	8300 : 8363	1	R/W	C	0: Unused 1: Used	0
115	Event 3 differential gap	HC	CH1 : CH64	20AC : 20EB	8364 : 8427	7	R/W	C	① Deviation, process, set value, Deviation action between channels, or Temperature rise completion: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. ② MV: 0.0 to 110.0 %	①: 1 ②: 1.0
116	Event 3 delay timer	TE	CH1 : CH64	20EC : 212B	8428 : 8491	7	R/W	C	0 to 18000 seconds If Event 3 corresponds to "9: Temperature rise completion," the Event 3 delay timer becomes the temperature rise completion soak time.	0

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
117	Force ON of Event 3 action	OC	CH1 : CH64	212C : 216B	8492 : 8555	7	R/W	C	• RKC communication Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the Autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalidate 1: Validate • Modbus Bit data Bit 0: Event output turned on at input error occurrence Bit 1: Event output turned on in manual mode Bit 2: Event output turned on during the Autotuning (AT) function is being executed Bit 3: Event output turned on during the setting change rate limiter is being operated Bit 4 to Bit 15: Unused Data 0: Invalidate 1: Validate [Decimal number: 0 to 15]	0
118	Event 4 type	XD	CH1 : CH64	216C : 21AB	8556 : 8619	7	R/W	C	0: None 1: Deviation high (Using SV monitor value) [1] 2: Deviation low (Using SV monitor value) [1] 3: Deviation high/low (Using SV monitor value) [1] 4: Band (Using SV monitor value) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Control loop break alarm (LBA) 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Using local SV value) [1] 15: Deviation low (Using local SV value) [1] 16: Deviation high/low (Using local SV value) [1] 17: Band (Using local SV value) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in Position proportioning PID control, set to the feedback resistance (FBR) input value.	Based on model code When not specifying: 0

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
119	Event 4 channel setting	FD	CH1 : CH64	21AC : 21EB	8620 : 8683	1	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when “deviation between channels”is selected.	1
120	Event 4 hold action	WD	CH1 : CH64	21EC : 222B	8684 : 8747	1	R/W	C	0: OFF 1: Hold action ON (when power turned on; when transferred from STOP to RUN) 2: Re-hold action ON (when power turned on; when transferred from STOP to RUN; SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Based on model code When not specifying: 0
121	Event 4 interlock	LI	CH1 : CH64	222C : 226B	8748 : 8811	1	R/W	C	0: Unused 1: Used	0
122	Event 4 differential gap	HD	CH1 : CH64	226C : 22AB	8812 : 8875	7	R/W	C	① Deviation, process, set value, or Deviation action between channels: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. ② MV: 0.0 to 110.0 % Becomes invalid when the Event 4 type corresponds to “9: Control loop break alarm (LBA).”	①: 1 ②: 1.0
123	Event 4 delay timer	TF	CH1 : CH64	22AC : 22EB	8876 : 8939	7	R/W	C	0 to 18000 seconds	0
124	Force ON of Event 4 action	OD	CH1 : CH64	22EC : 232B	8940 : 9003	7	R/W	C	• RKC communication Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the Autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalidate 1: Validate • Modbus Bit data Bit 0: Event output turned on at input error occurrence Bit 1: Event output turned on in manual mode Bit 2: Event output turned on during the Autotuning (AT) function is being executed Bit 3: Event output turned on during the setting change rate limiter is being operated Bit 4 to Bit 15: Unused Data 0: Invalidate 1: Validate [Decimal number: 0 to 15]	0

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
125	CT ratio	XS	CH1 : CH64	232C : 236B	9004 : 9067	7	R/W	C	0 to 9999	CTL-6-P-N: 800 CTL-12-S56-10L-N: 1000
126	CT assignment	ZF	CH1 : CH64	236C : 23AB	9068 : 9131	1	R/W	C	0: None 1: OUT1 2: OUT2 3: OUT3 4: OUT4	CH1: 1, CH2: 2 CH3: 3, CH4: 4 (for each Z-TIO module)
127	Heater break alarm (HBA) type	ND	CH1 : CH64	23AC : 23EB	9132 : 9195	1	R/W	C	0: Heater break alarm (HBA) type A (Time-proportional control output) 1: Heater break alarm (HBA) type B (Continuous control output)	Set value is based on the Output type specified at ordering.
128	Number of heater break alarm (HBA) delay times	DH	CH1 : CH64	23EC : 242B	9196 : 9259	7	R/W	C	0 to 255 times	5
129	Hot/Cold start	XN	CH1 : CH64	242C : 246B	9260 : 9323	1	R/W	C	0: Hot start 1 1: Hot start 2 2: Cold start	0
130	Start determination point	SX	CH1 : CH64	246C : 24AB	9324 : 9387	7	R/W	C	0 (0.0) to Input span (The unit is the same as input value.) 0 (0.0): Action depending on the Hot/Cold start selection Varies with the setting of the decimal point position.	Based on specification
131	SV tracking	XL	CH1 : CH64	24AC : 24EB	9388 : 9451	1	R/W	C	0: Unused 1: Used	1
132	MV transfer function [Action taken when changed to Manual mode from Auto mode]	OT	CH1 : CH64	24EC : 252B	9452 : 9515	1	R/W	C	0: MV in Auto mode is used. [Balanceless/Bumpless function] 1: MV in previous Manual mode is used.	0
133	Control action	XE	CH1 : CH64	252C : 256B	9516 : 9579	1	R/W	C	0: Brilliant II PID control (Direct action) 1: Brilliant II PID control (Reverse action) 2: Brilliant II Heat/Cool PID control [Water cooling type] 3: Brilliant II Heat/Cool PID control [Air cooling type] 4: Brilliant II Heat/Cool PID control [Cooling gain linear type] 5: Brilliant II position proportioning PID control Odd channel: From 0 to 5 can be set. Even channel: Only 0 or 1 can be set. * * In Heat/Cool PID control and Position proportioning PID control, control action is not performed. Only PV monitor and event action is performed.	Based on model code When not specifying: 1
134	Integral/Derivative time decimal point position ♣	PK	CH1 : CH64	256C : 25AB	9580 : 9643	1	R/W	C	0: 1 second setting (No decimal place) 1: 0.1 seconds setting (One decimal place)	0
135	Derivative action ♣	KA	CH1 : CH64	25AC : 25EB	9644 : 9707	1	R/W	C	0: Measured value derivative 1: Deviation derivative	0

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
136	Undershoot suppression factor ♣	KB	CH1 : CH64	25EC : 262B	9708 : 9771	7	R/W	C	0.000 to 1.000	Water cooling: 0.100 Air cooling: 0.250 Cooling gain linear type: 1.000
137	Derivative gain ♣	DG	CH1 : CH64	262C : 266B	9772 : 9835	7	R/W	C	0.1 to 10.0	6.0
138	ON/OFF action differential gap (upper)	IV	CH1 : CH64	266C : 26AB	9836 : 9899	7	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.0 to 100.0 % of input span	TC/RTD: 1 V/I: 0.1
139	ON/OFF action differential gap (lower)	IW	CH1 : CH64	26AC : 26EB	9900 : 9963	7	R/W	C		TC/RTD: 1 V/I: 0.1
140	Action (high) at input error	WH	CH1 : CH64	26EC : 272B	9964 : 10027	1	R/W	C	0: Normal control 1: Manipulated output value at Input error	0
141	Action (low) at input error	WL	CH1 : CH64	272C : 276B	10028 : 10091	1	R/W	C		0
142	Manipulated output value at input error	OE	CH1 : CH64	276C : 27AB	10092 : 10155	7	R/W	C	–105.0 to +105.0 % Actual output values become those restricted by the output limiter. Position proportioning PID control: If there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected, an action taken when abnormal is in accordance with the value action setting during STOP.	0.0
143	Manipulated output value at STOP mode [heat-side] ♣	OF	CH1 : CH64	27AC : 27EB	10156 : 10219	7	R/W	C	–5.0 to +105.0 % Position proportioning PID control: Only when there is feedback resistance (FBR) input and it does not break, the manipulated output value [heat-side] at STOP is output.	–5.0
144	Manipulated output value at STOP mode [cool-side] ♣	OG	CH1 : CH64	27EC : 282B	10220 : 10283	7	R/W	C		–5.0
145	Output change rate limiter (up) [heat-side] ♣	PH	CH1 : CH64	282C : 286B	10284 : 10347	7	R/W	C	0.0 to 100.0 % of manipulated output/seconds (0.0: OFF) Becomes invalid when in Position proportioning PID control.	0.0
146	Output change rate limiter (down) [heat-side] ♣	PL	CH1 : CH64	286C : 28AB	10348 : 10411	7	R/W	C		0.0
147	Output limiter high [heat-side] ♣	OH	CH1 : CH64	28AC : 28EB	10412 : 10475	7	R/W	C	Output limiter low to 105.0 % Position proportioning PID control: Becomes valid only when there is feedback resistance (FBR) input and it does not break.	105.0
148	Output limiter low [heat-side] ♣	OL	CH1 : CH64	28EC : 292B	10476 : 10539	7	R/W	C	–5.0 % to Output limiter high Position proportioning PID control: Becomes valid only when there is feedback resistance (FBR) input and it does not break.	–5.0

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
149	Output change rate limiter (up) [cool-side] ♣	PX	CH1 : CH64	292C : 296B	10540 : 10603	7	R/W	C	0.0 to 100.0 % of manipulated output/seconds (0.0: OFF) Becomes invalid when in Position proportioning PID control.	0.0
150	Output change rate limiter (down) [cool-side] ♣	PY	CH1 : CH64	296C : 29AB	10604 : 10667	7	R/W	C		0.0
151	Output limiter high [cool-side] ♣	OX	CH1 : CH64	29AC : 29EB	10668 : 10731	7	R/W	C	Output limiter low [cool-side] to 105.0 %	105.0
152	Output limiter low [cool-side] ♣	OY	CH1 : CH64	29EC : 2A2B	10732 : 10795	7	R/W	C	–5.0 % to Output limiter high [cool-side]	–5.0
153	AT bias ♣	GB	CH1 : CH64	2A2C : 2A6B	10796 : 10859	7	R/W	C	–Input span to +Input span Varies with the setting of the decimal point position.	0
154	AT cycles ♣	G3	CH1 : CH64	2A6C : 2AAB	10860 : 10923	1	R/W	C	0: 1.5 cycles 1: 2.0 cycles 2: 2.5 cycles 3: 3.0 cycles	1
155	Output value with AT turned on ♣	OP	CH1 : CH64	2AAC : 2AEB	10924 : 10987	7	R/W	C	Output value with AT turned off to +105.0 % Actual output values become those restricted by the output limiter. Position proportioning PID control: Becomes valid only when there is feedback resistance (FBR) input and it does not break (high limit of feedback resistance input at AT).	105.0
156	Output value with AT turned off ♣	OQ	CH1 : CH64	2AEC : 2B2B	10988 : 11051	7	R/W	C	–105.0 % to Output value with AT turned on Actual output values become those restricted by the output limiter. Position proportioning PID control: Becomes valid only when there is feedback resistance (FBR) input and it does not break (low limit of feedback resistance input at AT).	–105.0
157	AT differential gap time ♣	GH	CH1 : CH64	2B2C : 2B6B	11052 : 11115	7	R/W	C	0.0 to 50.0 seconds	10.0
158	Proportional band adjusting factor [heat-side] ♣	KC	CH1 : CH64	2B6C : 2BAB	11116 : 11179	7	R/W	C	0.01 to 10.00 times	1.00
159	Integral time adjusting factor [heat-side] ♣	KD	CH1 : CH64	2BAC : 2BEB	11180 : 11243	7	R/W	C	0.01 to 10.00 times	1.00
160	Derivative time adjusting factor [heat-side] ♣	KE	CH1 : CH64	2BEC : 2C2B	11244 : 11307	7	R/W	C	0.01 to 10.00 times	1.00
161	Proportional band adjusting factor [cool-side] ♣	KF	CH1 : CH64	2C2C : 2C6B	11308 : 11371	7	R/W	C	0.01 to 10.00 times	1.00

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

Continued on the next page.

Continued from the previous page.

No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
162	Integral time adjusting factor [cool-side] ♣	KG	CH1 : CH64	2C6C : 2CAB	11372 : 11435	7	R/W	C	0.01 to 10.00 times	1.00
163	Derivative time adjusting factor [cool-side] ♣	KH	CH1 : CH64	2CAC : 2CEB	11436 : 11499	7	R/W	C	0.01 to 10.00 times	1.00
164	Proportional band limiter (high) [heat-side] ♣	P6	CH1 : CH64	2CEC : 2D2B	11500 : 11563	7	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.0 to 1000.0 % of input span 0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a Heat/Cool PID control type.)	TC/RTD: Input span V/I: 1000.0
165	Proportional band limiter (low) [heat-side] ♣	P7	CH1 : CH64	2D2C : 2D6B	11564 : 11627	7	R/W	C		TC/RTD: 0 (0.0) V/I: 0.0
166	Integral time limiter (high) [heat-side] ♣	I6	CH1 : CH64	2D6C : 2DAB	11628 : 11691	7	R/W	C	PID control or Heat/Cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds Position proportioning PID control: 1 to 3600 seconds or 0.1 to 1999.9 seconds Varies with the setting of the Integral/Derivative time decimal point position.	3600
167	Integral time limiter (low) [heat-side] ♣	I7	CH1 : CH64	2DAC : 2DEB	11692 : 11755	7	R/W	C		PID control, Heat/Cool PID control: 0 Position proportioning PID control: 1
168	Derivative time limiter (high) [heat-side] ♣	D6	CH1 : CH64	2DEC : 2E2B	11756 : 11819	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the Integral/Derivative time decimal point position.	3600
169	Derivative time limiter (low) [heat-side] ♣	D7	CH1 : CH64	2E2C : 2E6B	11820 : 11883	7	R/W	C		0
170	Proportional band limiter (high) [cool-side] ♣	P8	CH1 : CH64	2E6C : 2EAB	11884 : 11947	7	R/W	C	TC/RTD inputs: 1 (1.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.1 to 1000.0 % of input span	TC/RTD: Input span V/I: 1000.0
171	Proportional band limiter (low) [cool-side] ♣	P9	CH1 : CH64	2EAC : 2EEB	11948 : 12011	7	R/W	C		TC/RTD: 1 (0.1) V/I: 0.1
172	Integral time limiter (high) [cool-side] ♣	I8	CH1 : CH64	2EEC : 2F2B	12012 : 12075	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the Integral/Derivative time decimal point position. If control is other than Heat/Cool PID control, set to RO (Only reading data is possible).	3600
173	Integral time limiter (low) [cool-side] ♣	I9	CH1 : CH64	2F2C : 2F6B	12076 : 12139	7	R/W	C		0
174	Derivative time limiter (high) [cool-side] ♣	D8	CH1 : CH64	2F6C : 2FAB	12140 : 12203	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the Integral/Derivative time decimal point position. If control is other than Heat/Cool PID control, set to RO (Only reading data is possible).	3600
175	Derivative time limiter (low) [cool-side] ♣	D9	CH1 : CH64	2FAC : 2FEB	12204 : 12267	7	R/W	C		0

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
176	Open/Close output neutral zone ♣	V2	CH1 : CH64	2FEC : 302B	12268 : 12331	7	R/W	C	0.1 to 10.0 % of output	2.0
177	Action at feedback resistance (FBR) input error ♣	SY	CH1 : CH64	302C : 306B	12332 : 12395	1	R/W	C	0: Action depending on the valve action at STOP 1: Control action continued	0
178	Feedback adjustment ♣	FV	CH1 : CH64	306C : 30AB	12396 : 12459	1	R/W	C	0: Adjustment end 1: Open-side adjustment start 2: Close-side adjustment start	—
179	Control motor time ♣	TN	CH1 : CH64	30AC : 30EB	12460 : 12523	7	R/W	C	5 to 1000 seconds	10
180	Integrated output limiter ♣	OI	CH1 : CH64	30EC : 312B	12524 : 12587	7	R/W	C	0.0 to 200.0 % of control motor time (0.0: OFF) Becomes invalid when there is feedback resistance (FBR) input.	150.0
181	Valve action at STOP ♣	VS	CH1 : CH64	312C : 316B	12588 : 12651	1	R/W	C	0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON Becomes valid when there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected.	0
182	ST proportional band adjusting factor	KI	CH1 : CH64	316C : 31AB	12652 : 12715	7	R/W	C	0.01 to 10.00 times	1.00
183	ST integral time adjusting factor	KJ	CH1 : CH64	31AC : 31EB	12716 : 12779	7	R/W	C	0.01 to 10.00 times	1.00
184	ST derivative time adjusting factor	KK	CH1 : CH64	31EC : 322B	12780 : 12843	7	R/W	C	0.01 to 10.00 times	1.00
185	ST start condition	SU	CH1 : CH64	322C : 326B	12844 : 12907	1	R/W	C	0: Activate the Startup tuning (ST) function when the power is turned on; when transferred from STOP to RUN; or when the Set value (SV) is changed. 1: Activate the Startup tuning (ST) function when the power is turned on; or when transferred from STOP to RUN. 2: Activate the Startup tuning (ST) function when the Set value (SV) is changed.	0
186	Automatic temperature rise group	Y7	CH1 : CH64	326C : 32AB	12908 : 12971	7	R/W	C	0 to 16 (0: Automatic temperature rise function OFF)	0
187	Automatic temperature rise dead time	RT	CH1 : CH64	32AC : 32EB	12972 : 13035	7	R/W	C	0.1 to 1999.9 seconds	10.0
188	Automatic temperature rise gradient data	R2	CH1 : CH64	32EC : 332B	13036 : 13099	7	R/W	C	0.1 to Input span/minutes Varies with the setting of the decimal point position.	1.0

♣ Parameters only used for Heat/Cool PID control or Position proportioning PID control, therefore data for CH2 and CH4 of Z-TIO modules are unused.

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No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
189	EDS transfer time decimal point position	NS	CH1 : CH64	332C : 336B	13100 : 13163	1	R/W	C	0: 1 second setting (No decimal place) 1: 0.1 seconds setting (One decimal place)	0
190	Output average processing time for EDS	NV	CH1 : CH64	336C : 33AB	13164 : 13227	7	R/W	C	0.1 to 200.0 seconds	1.0
191	Responsive action trigger point for EDS	NW	CH1 : CH64	33AC : 33EB	13228 : 13291	7	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.0 to Input span (Unit: %)	TC/RTD: 1 (1.0) V/I: 1.0
192	Setting change rate limiter unit time	HU	CH1 : CH64	33EC : 342B	13292 : 13355	7	R/W	C	1 to 3600 seconds	60
193	Soak time unit	RU	CH1 : CH64	342C : 346B	13356 : 13419	7	R/W	C	• RKC communication 0: 0:00 to 99:59 (hrs:min) [0 hours 00 minutes to 99 hours 59 minutes] 1: 0:00 to 199:59 (min:sec) [0 minutes 00 seconds to 199 minutes 59 seconds] • Modbus 0: 0 to 5999 minutes [0 hours 00 minutes to 99 hours 59 minutes] 1: 0 to 11999 seconds [0 minutes 00 seconds to 199 minutes 59 seconds] Set the data range of Memory area soak time monitor and Area soak time.	1
194	Setting limiter high	SH	CH1 : CH64	346C : 34AB	13420 : 13483	7	R/W	C	Setting limiter low to Input scale high Varies with the setting of the decimal point position.	Input scale high
195	Setting limiter low	SL	CH1 : CH64	34AC : 34EB	13484 : 13547	7	R/W	C	Input scale low to Setting limiter high Varies with the setting of the decimal point position.	Input scale low
196	PV transfer function	TS	CH1 : CH64	34EC : 352B	13548 : 13611	1	R/W	C	0: Unused 1: Used	0
197	Operation mode assignment 1 (Logic output selection function) Logic output 1 to 4	EA	CH1 : CH64	352C : 356B	13612 : 13675	7	R/W	C	0: No assignment 1: Operation mode (monitor, control) 2: Operation mode (monitor, event function, control) 3: Auto/Manual 4: Remote/Local 5: Unused (Do not set this one)	0
198	Operation mode assignment 2 (Logic output selection function) Logic output 5 to 8	EB	CH1 : CH64	356C : 35AB	13676 : 13739	7	R/W	C	0: No assignment 1: Operation mode (monitor, control) 2: Operation mode (monitor, event function, control) 3: Auto/Manual 4: Remote/Local 5: Unused (Do not set this one)	0

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No.	Name	Iden-tifier	Chan-nel	Register address HEX	Register address DEC	Digits	Attri-bute	Struc-ture	Data range	Factory set value
199	SV select function	KM	CH1 ⋮ CH64	35AC ⋮ 35EB	13740 ⋮ 13803	1	R/W	C	0: Remote SV function 1: Cascade control function 2: Ratio setting function 3: Cascade control 2 function	0
200	Remote SV function master channel module address	MC	CH1 ⋮ CH64	35EC ⋮ 362B	13804 ⋮ 13867	7	R/W	C	–1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	–1
201	Remote SV function master channel selection	MN	CH1 ⋮ CH64	362C ⋮ 366B	13868 ⋮ 13931	7	R/W	C	1 to 99	1
202	Output distribution master channel module address	DY	CH1 ⋮ CH64	366C ⋮ 36AB	13932 ⋮ 13995	7	R/W	C	–1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	–1
203	Output distribution master channel selection	DZ	CH1 ⋮ CH64	36AC ⋮ 36EB	13996 ⋮ 14059	7	R/W	C	1 to 99	1
204	Address of interacting modules	RL	CH1 ⋮ CH64	36EC ⋮ 372B	14060 ⋮ 14123	7	R/W	C	–1 (Interact with its own module address) 0 to 99 (Interact with the addresses of other modules)	–1
205	Channel selection of interacting modules	RM	CH1 ⋮ CH64	372C ⋮ 376B	14124 ⋮ 14187	7	R/W	C	1 to 99 Becomes valid when the selected module is “Z-TIO module.”	1
206	Selection switch of interacting modules	RN	CH1 ⋮ CH64	376C ⋮ 37AB	14188 ⋮ 14251	7	R/W	C	• RKC communication Least significant digit: Memory area number 2nd digit: Operation mode 3rd digit: Auto/Manual 4th digit: Remote/Local 5th digit EDS start signal 6th digit Interlock release Most significant digit: Suspension of area soak time Data 0: No interaction 1: Interact with other channels • Modbus Bit data Bit 0: Memory area number Bit 1: Operation mode Bit 2: Auto/Manual Bit 3: Remote/Local Bit 4: EDS start signal Bit 5: Interlock release Bit 6: Suspension of area soak time Bit 7 to Bit 15: Unused Data 0: No interaction 1: Interact with other channels [Decimal number: 0 to 127]	0
207	TIO Interval time	VG	CH1 ⋮ CH16	37AC ⋮ 37BB	14252 ⋮ 14267	7	R/W	M	0 to 250 ms	10
208	Unused	—	—	37BC ⋮ 386B	14268 ⋮ 14443	—	—	—	—	—

8.4 Communication Data of Z-DIO Module

☞ For details of Z-DIO module communication data, refer to **SRZ Instruction Manual (IMS01T04-E□)**.

No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
1	Digital input (DI) state 1	L1	CH1 : CH16	3E6C : 3E7B	15980 : 15995	7	RO	M	• RKC communication Least significant digit: DI1 2nd digit: DI2 3rd digit: DI3 4th digit: DI4 5th digit to Most significant digit: Unused Data 0: Contact open 1: Contact closed • Modbus Bit data Bit 0: DI1 Bit 1: DI2 Bit 2: DI3 Bit 3: DI4 Bit 4: DI5 Bit 5: DI6 Bit 6: DI7 Bit 7: DI8 Bit 8 to Bit 15: Unused Data 0: Contact open 1: Contact closed [Decimal number: 0 to 255]	—
2	Digital input (DI) state 2	L6	CH1 : CH16	—	—	7	RO	M	• RKC communication Least significant digit: DI5 2nd digit: DI6 3rd digit: DI7 4th digit: DI8 5th digit to Most significant digit: Unused Data 0: Contact open 1: Contact closed	—
3	Digital output (DO) state 1	Q2	CH1 : CH16	3E7C : 3E8B	15996 : 16011	7	RO	M	• RKC communication Least significant digit: DO1 2nd digit: DO2 3rd digit: DO3 4th digit: DO4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit data Bit 0: DO1 Bit 1: DO2 Bit 2: DO3 Bit 3: DO4 Bit 4: DO5 Bit 5: DO6 Bit 6: DO7 Bit 7: DO8 Bit 8 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255]	—
4	Digital output (DO) state 2	Q3	CH1 : CH16	—	—	7	RO	M	• RKC communication Least significant digit: DO5 2nd digit: DO6 3rd digit: DO7 4th digit: DO8 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—

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No.	Name	Identifier	Channel	Register address HEX	Register address DEC	Digits	Attribute	Structure	Data range	Factory set value
5	Unused	—	—	3E8C ⋮ 3FDB	16012 ⋮ 16347	—	—	—	—	—
6	DO manual output 1	Q4	CH1 ⋮ CH16	3FDC ⋮ 3FEB	16348 ⋮ 16363	7	R/W	M	• RKC communication Least significant digit: DO1 manual output 2nd digit: DO2 manual output 3rd digit: DO3 manual output 4th digit: DO4 manual output 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit data Bit 0: DO1 manual output Bit 1: DO2 manual output Bit 2: DO3 manual output Bit 3: DO4 manual output Bit 4: DO5 manual output Bit 5: DO6 manual output Bit 6: DO7 manual output Bit 7: DO8 manual output Bit 8 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255]	0
7	DO manual output 2	Q5	CH1 ⋮ CH16	—	—	7	R/W	M	• RKC communication Least significant digit: DO5 manual output 2nd digit: DO6 manual output 3rd digit: DO7 manual output 4th digit: DO8 manual output 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	0
8	DO output distribution selection	DO	CH1 ⋮ CH128	3FEC ⋮ 406B	16364 ⋮ 16491	1	R/W	C	0: DO output 1: Distribution output	0
9	DO output distribution bias	O8	CH1 ⋮ CH128	406C ⋮ 40EB	16492 ⋮ 16619	7	R/W	C	−100.0 to +100.0 %	0.0
10	DO output distribution ratio	O9	CH1 ⋮ CH128	40EC ⋮ 416B	16620 ⋮ 16747	7	R/W	C	−9.999 to +9.999	1.000
11	DO proportional cycle time	V0	CH1 ⋮ CH128	416C ⋮ 41EB	16748 ⋮ 16875	7	R/W	C	0.1 to 100.0 seconds	Relay contact output: 20.0 Open collector output: 2.0
12	DO minimum ON/OFF time of proportioning cycle	VJ	CH1 ⋮ CH128	41EC ⋮ 426B	16876 ⋮ 17003	7	R/W	C	0 to 1000 ms	0
13	Unused	—	—	426C ⋮ 433B	17004 ⋮ 17211	—	—	—	—	—
Set data No. 14 or later are for engineering setting [Writable in the STOP mode]										
14	DI function assignment	H2	CH1 ⋮ CH16	433C ⋮ 434B	17212 ⋮ 17227	7	R/W	M	0 to 29 (Refer to **P. 90**.)	Based on model code. When not specifying: 0

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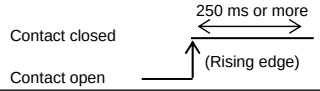
No.	Name	Iden-tifier	Chan-nel	Register address		Digits	Attri-bute	Struc-ture	Data range	Factory set value
				HEX	DEC					
15	Memory area setting signal	E1	CH1 : CH16	434C : 435B	17228 : 17243	1	R/W	M	0: Valid 1: Invalid	1
16	DO signal assignment module address 1	LQ	CH1 : CH16	435C : 436B	17244 : 17259	7	R/W	M	–1, 0 to 99 When "–1" is selected, all of the signals of the same type (except temperature rise completion and DO manual output value) are *OR*-operated and produced as outputs from DO.	–1
17	DO signal assignment module address 2	LR	CH1 : CH16	436C : 437B	17260 : 17275	7	R/W	M	–1, 0 to 99 When "–1" is selected, all of the signals of the same type (except temperature rise completion and DO manual output value) are *OR*-operated and produced as outputs from DO.	–1
18	DO output assignment 1 [DO1 to DO4]	LT	CH1 : CH16	437C : 438B	17276 : 17291	7	R/W	M	0 to 13 (Refer to **P. 91**.)	Based on model code. When not specifying: 0
19	DO output assignment 2 [DO5 to DO8]	LX	CH1 : CH16	438C : 439B	17292 : 17307	7	R/W	M	0 to 13 (Refer to **P. 91**.)	Based on model code. When not specifying: 0
20	DO Energized/ De-energized	NB	CH1 : CH128	439C : 441B	17308 : 17435	7	R/W	C	0: Energized 1: De-energized	0
21	DO output distribution master channel module address	DD	CH1 : CH128	441C : 449B	17436 : 17563	7	R/W	C	–1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	–1
22	DO output distribution master channel selection	DJ	CH1 : CH128	449C : 451B	17564 : 17691	7	R/W	C	1 to 99	1
23	DO manipulated output value (MV) at STOP mode	OJ	CH1 : CH128	451C : 459B	17692 : 17819	7	R/W	C	–5.0 to +105.0 %	–5.0
24	DO output limiter (high)	D3	CH1 : CH128	459C : 461B	17820 : 17947	7	R/W	C	DO output limiter (low) to 105.0 %	105.0
25	DO output limiter (low)	D4	CH1 : CH128	461C : 469B	17948 : 18075	7	R/W	C	–5.0 % to DO output limiter (high)	–5.0
26	Z-DIO Interval time	VF	CH1 : CH16	469C : 46AB	18076 : 18091	7	R/W	M	0 to 250 ms	10
27	Unused	—	—	46AC : 46BB	18092 : 18107	—	—	—	—	—

Table 1: DI assignment table

Set value	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8
0	No assignment							
1	Memory area transfer (1 to 8) [1]			Area set [2]	Operation mode [3]		Interlock release	AUTO/MAN [4]
2								REM/LOC [4]
3								EDS start signal 1
4								Soak stop
5								RUN/STOP [4]
6							AUTO/MAN [4]	REM/LOC [4]
7								EDS start signal 1
8								Soak stop
9								RUN/STOP [4]
10							REM/LOC [4]	EDS start signal 1
11								Soak stop
12								RUN/STOP [4]
13							EDS start signal 1	Soak stop
14								RUN/STOP [4]
15							Soak stop	
16					Interlock release	AUTO/MAN [4]	REM/LOC [4]	EDS start signal 1
17								Soak stop
18								RUN/STOP [4]
19							EDS start signal 1	Soak stop
20								RUN/STOP [4]
21							Soak stop	
22					AUTO/MAN	REM/LOC	EDS start signal 1	Soak stop
23								RUN/STOP [4]
24							Soak stop	
25					REM/LOC	EDS start signal 1		
26	Memory area transfer (1, 2) [1]	Area set [2]	Interlock release	RUN/STOP [4]	AUTO/MAN [4]	REM/LOC [4]	Operation mode [3]	
27	Memory area transfer (1 to 8) [1]			Area set [2]	Operation mode [3]		EDS start signal 1	EDS start signal 2
28	Memory area transfer (1, 2) [1]	Area set [2]	Interlock release	RUN/STOP [4]	AUTO/MAN [4]	REM/LOC [4]		
29	EDS start signal 1	EDS start signal 2					Operation mode [3]	

RUN/STOP: RUN/STOP transfer (Contact closed: RUN)
AUTO/MAN: Auto/Manual transfer (Contact closed: Manual mode)
REM/LOC: Remote/Local transfer (Contact closed: Remote mode)
Interlock release (Interlock release when rising edge is detected)
EDS start signal 1 (EDS start signal ON when rising edge is detected [for disturbance 1])
EDS start signal 2 (EDS start signal ON when rising edge is detected [for disturbance 2])
Soak stop (Contact closed: Soak stop)

DI signal will become valid at rising edge after the closed contact is held for 250 ms.



[1] Memory area transfer

(×:Contact open –: Contact closed)

	Memory area number							
	1	2	3	4	5	6	7	8
DI1	×	–	×	–	×	–	×	–
DI2	×	×	–	–	×	×	–	–
DI3	×	×	×	×	–	–	–	–

[2] Area set becomes invalid prior to factory shipment.

[3] Operation mode transfer

(×:Contact open –: Contact closed)

	Operation mode			
	Unused	Monitor	Monitor + Event function	Control
DI5 (DI7)	×	–	×	–
DI6 (DI8)	×	×	–	–

[4] Actual device states (AUTO/MAN, REM/LOC, RUN/STOP)

	DI-switched state	Communication-switched state	Actual device state
Auto/Manual transfer [a] (AUTO/MAN)	Manual (Contact closed)	Manual → Auto	Manual mode
		Auto → Manual	
	Auto (Contact open)	Manual → Auto	Auto mode
		Auto → Manual	
Remote/Local transfer [a] (REM/LOC)	Remote (Contact closed)	Remote → Local	Remote mode
		Local → Remote	
	Local (Contact open)	Remote → Local	Local mode
		Local → Remote	
RUN/STOP [b]	RUN (Contact closed)	STOP → RUN	RUN
		RUN → STOP	STOP
	STOP (Contact open)	STOP → RUN	STOP

[a] Device state when AUTO/MAN or REM/LOC assigned to DI is set so that the Z-TIO module and Z-DIO module are linked using the Master-slave mode of the Z-TIO module.

[b] STOP of RUN/STOP switching is given priority regardless of communication or DI switching.

Table 2: DO assignment table

[DO1 to DO4]

Set value	DO1	DO2	DO3	DO4
0	No assignment			
1	DO1 manual output	DO2 manual output	DO3 manual output	DO4 manual output
2	Event 1 comprehensive output [1]	Event 2 comprehensive output [2]	Event 3 comprehensive output [3]	Event 4 comprehensive output [4]
3	Event 1 (CH1)	Event 2 (CH1)	Event 3 (CH1)	Event 4 (CH1)
4	Event 1 (CH2)	Event 2 (CH2)	Event 3 (CH2)	Event 4 (CH2)
5	Event 1 (CH3)	Event 2 (CH3)	Event 3 (CH3)	Event 4 (CH3)
6	Event 1 (CH4)	Event 2 (CH4)	Event 3 (CH4)	Event 4 (CH4)
7	Event 1 (CH1)	Event 1 (CH2)	Event 1 (CH3)	Event 1 (CH4)
8	Event 2 (CH1)	Event 2 (CH2)	Event 2 (CH3)	Event 2 (CH4)
9	Event 3 (CH1)	Event 3 (CH2)	Event 3 (CH3)	Event 3 (CH4)
10	Event 4 (CH1)	Event 4 (CH2)	Event 4 (CH3)	Event 4 (CH4)
11	HBA (CH1) of Z-TIO module	HBA (CH2) of Z-TIO module	HBA (CH3) of Z-TIO module	HBA (CH4) of Z-TIO module
12	Burnout status (CH1)	Burnout status (CH2)	Burnout status (CH3)	Burnout status (CH4)
13	Temperature rise completion [5]	HBA comprehensive output [6]	Burnout state comprehensive output [7]	DO4 manual output

[DO5 to DO8]

Set value	DO5	DO6	DO7	DO8
0	No assignment			
1	DO5 manual output	DO6 manual output	DO7 manual output	DO8 manual output
2	Event 1 comprehensive output [1]	Event 2 comprehensive output [2]	Event 3 comprehensive output [3]	Event 4 comprehensive output [4]
3	Event 1 (CH1)	Event 2 (CH1)	Event 3 (CH1)	Event 4 (CH1)
4	Event 1 (CH2)	Event 2 (CH2)	Event 3 (CH2)	Event 4 (CH2)
5	Event 1 (CH3)	Event 2 (CH3)	Event 3 (CH3)	Event 4 (CH3)
6	Event 1 (CH4)	Event 2 (CH4)	Event 3 (CH4)	Event 4 (CH4)
7	Event 1 (CH1)	Event 1 (CH2)	Event 1 (CH3)	Event 1 (CH4)
8	Event 2 (CH1)	Event 2 (CH2)	Event 2 (CH3)	Event 2 (CH4)
9	Event 3 (CH1)	Event 3 (CH2)	Event 3 (CH3)	Event 3 (CH4)
10	Event 4 (CH1)	Event 4 (CH2)	Event 4 (CH3)	Event 4 (CH4)
11	HBA (CH1) of Z-TIO module	HBA (CH2) of Z-TIO module	HBA (CH3) of Z-TIO module	HBA (CH4) of Z-TIO module
12	Burnout status (CH1)	Burnout status (CH2)	Burnout status (CH3)	Burnout status (CH4)
13	Temperature rise completion [5]	HBA comprehensive output [6]	Burnout state comprehensive output [7]	DO8 manual output

[1] Logical *OR* of Event 1 (ch1 to ch4)
[2] Logical *OR* of Event 2 (ch1 to ch4)
[3] Logical *OR* of Event 3 (ch1 to ch4)
[4] Logical *OR* of Event 4 (ch1 to ch4)
[5] Temperature rise completion status (ON when temperature rise completion occurs for all channels for which event 3 is set to temperature rise completion.)
[6] The following signals are output depending on the setting of the DO signal assignment module address.
- Logical *OR* of HBA (ch1 to ch4) of Z-TIO module
- Logical *OR* of HBA (ch1 to ch12) of Z-CT module
- Logical *OR* of HBA (ch1 to ch4) of Z-TIO module and HBA (ch1 to ch12) of Z-CT module

[7] Logical *OR* of burnout state (ch1 to ch4)

To output the HBA signal of a Z-CT module from DO, set “13.” For details of the Z-CT module, refer to **Z-CT Instruction Manual [Detailed version] (IMS01T21-E□)**.

8.5 Communication Data of Z-CT Module

☞ For details of Z-CT module communication data, refer to **Z-CT Instruction Manual [Detailed version] (IMS01T21-E□)**.

No.	Name	Identifier	Channel	Resister address HEX	Resister address DEC	Digits	Attribute	Structure	Data range	Factory set value
1	Current transformer (CT) input value monitor	M4	CH1 : CH192	46BC : 477B	18108 : 18299	7	RO	C	CTL-6-P-Z: 0.0 to 10.0 A CTL-6-P-N: 0.0 to 30.0 A CTL-12-S56-10L-N: 0.0 to 100.0 A	—
2	Load factor conversion CT monitor	M5	CH1 : CH192	477C : 483B	18300 : 18491	7	RO	C	0.0 to 100.0 A	—
3	Heater break alarm (HBA) state monitor	AF	CH1 : CH192	483C : 48FB	18492 : 18683	1	RO	C	0: Normal 1: Break 2: Melting	—
4	Heater overcurrent alarm state monitor	AG	CH1 : CH192	48FC : 49BB	18684 : 18875	1	RO	C	0: Normal 1: Heater overcurrent	—
5	Automatic setting state monitor [1]	CJ	CH1 : CH16	49BC : 49CB	18876 : 18891	1	RO	M	0: Normal state 1: Automatic setting execution 2: Automatic setting failure	—
6	Unused	—	—	49CC : 4FCB	18892 : 20427	—	—	—	—	—
7	Heater break/Heater overcurrent alarm automatic setting selection	BT	CH1 : CH192	4FCC : 508B	20428 : 20619	1	R/W	C	0: Automatic setting is disabled. (Alarm set value cannot be automatically set by the push button and communication.) 1: Automatic setting for heater break alarm is enabled. 2: Automatic setting for heater overcurrent alarm set value is enabled. 3: Automatic setting for heater break alarm (HBA) and heater overcurrent alarm set values are enabled.	1
8	Automatic setting transfer [2]	BU	CH1 : CH192	508C : 514B	20620 : 20811	1	R/W	C	0: Normal state 1: Automatic setting execution When automatic setting ends normally, this reverts to "0: Normal state." 2: Automatic setting failure (RO)	0
9	Heater break alarm (HBA) set value	A8	CH1 : CH192	514C : 520B	20812 : 21003	1	R/W	C	0.0 to 100.0 A 0.0: Heater break alarm function (HBA) OFF (HBA function OFF: The current transformer (CT) input value monitoring is available.)	0.0
10	Heater break alarm (HBA) selection	BZ	CH1 : CH192	520C : 52CB	21004 : 21195	1	R/W	C	0: Heater break alarm (HBA) unused 1: Heater break alarm (HBA) 2: Heater break alarm (HBA) (With alarm interlock function)	1

[1] This is linked to the solid lighting or blinking state of the automatic setting state indication lamp (SET).

[2] Automatic setting is only possible for channels that have been set to other than "0: Automatic setting is disabled" in heater break/heater overcurrent alarm automatic setting selection.

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No.	Name	Identifier	Channel	Resister address HEX	Resister address DEC	Digits	Attribute	Structure	Data range	Factory set value
11	Heater overcurrent alarm set value	A6	CH1 : CH192	52CC : 538B	21196 : 21387	7	R/W	C	0.0 to 105.0 A 0.0: Heater overcurrent alarm function OFF	0.0
12	Heater overcurrent alarm selection	BO	CH1 : CH192	538C : 544B	21388 : 21579	1	R/W	C	0: Heater overcurrent alarm unused 1: Heater overcurrent alarm 2: Heater overcurrent alarm (With alarm interlock function)	1
13	Heater break alarm (HBA) interlock release	CX	CH1 : CH192	544C : 550B	21580 : 21771	1	R/W	C	0: Normal state 1: Interlock release execution After the interlock is released, this automatically returns to “0.”	0
14	Heater overcurrent alarm interlock release	CY	CH1 : CH192	550C : 55CB	21772 : 21963	1	R/W	C	0: Normal state 1: Interlock release execution After the interlock is released, this automatically returns to “0.”	0
15	Unused	—	—	55CC : 5E0B	21964 : 24075	—	—	—	—	—
16	Set lock [1]	LK	CH1 : CH16	5E0C : 5E1B	24076 : 24091	1	R/W	M	0: Unlock 1: Lock	0
Set data No. 17 or later are for engineering setting [Writable in the STOP mode]										
17	CT type [2]	BV	CH1 : CH192	5E1C : 5EDB	24092 : 24283	1	R/W [3]	C	0: CTL-6-P-N (0.0 to 30.0 A) 1: CTL-12-S56-10L-N (0.0 to 100.0 A) 2: CTL-6-P-Z (0.0 to 10.0 A)	Based on model code. When not specifying: 0
18	CT ratio [4] (CT number of winds)	XT	CH1 : CH192	5EDC : 5F9B	24284 : 24475	7	R/W [3]	C	0 to 9999	CTL-6-P-N, CTL-6-P-Z: 800 CTL-12-S56-10L-N: 1000
19	Number of heater break alarm (HBA) delay times	DI	CH1 : CH192	5F9C : 605B	24476 : 24667	7	R/W [3]	C	0 to 255 times	5
20	Automatic setting factor for heater break alarm (HBA)	BW	CH1 : CH192	605C : 611B	24668 : 24859	7	R/W [3]	C	1 to 100 %	75
21	Automatic setting factor for heater overcurrent alarm	B9	CH1 : CH192	611C : 61DB	24860 : 25051	7	R/W [3]	C	100 to 1000 %	200
22	Determination current value for automatic setting	BP	CH1 : CH192	61DC : 629B	25052 : 25243	7	R/W [3]	C	0.0 to 100.0 A	1.0
23	Automatic setting time	BQ	CH1 : CH192	629C : 635B	25244 : 25435	7	R/W [3]	C	10 to 250 seconds	60

[1] When the RUN/STOP transfer (Identifier: SR, Resister address: 0133H) of the Z-COM module becomes STOP, set lock becomes “0: Unlock.” (i.e. The engineering setting data is writable.)

[2] When using a non-specified CT, set to “1: CTL-12-S56-10L-N (0.0 to 100.0 A).”

[3] When the set lock (Identifier: LK, Resister address: 5E0CH to 5E1BH) is set to “0: Unlock” (the RUN/STOP transfer of the Z-COM module becomes STOP), writing data is possible.

[4] When using a non-specified CT, set the number of winds of the CT.

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No.	Name	Identifier	Channel	Resister address		Digits	Attribute	Structure	Data range	Factory set value
				HEX	DEC					
24	Module address assignments for CT input	BX	CH1 : CH192	635C : 641B	25436 : 25627	7	R/W [1]	C	0 to 99	0
25	Module channel assignments for CT input	BY	CH1 : CH192	641C : 64DB	25628 : 25819	7	R/W [1]	C	1 to 99	1
26	Load factor conversion method [2]	IC	CH1 : CH192	64DC : 659B	25820 : 26011	1	R/W [1]	C	0: Mean conversion 1: Root mean squared value conversion	0
27	CT Interval time	VH	CH1 : CH16	659C : 65AB	26012 : 26027	7	R/W [1]	M	0 to 250 ms	10
28	Unused	—	—	65AC : 666B	26028 : 26219	—	—	—	—	—

[1] When the set lock (Identifier: LK, Resister address: 5E0CH to 5E1BH) is set to "0: Unlock" (the RUN/STOP transfer of the Z-COM module becomes STOP), writing data is possible.

[2] For monitoring using "0: Mean conversion" or "1: Root mean squared value conversion," the following settings are required:

- Module address assignments for CT input must be set.
- Module channel assignments for CT input must be set.
- The heater break alarm (HBA) value must be set to other than "0.0."

8.6 Memory Area Data Address (Z-TIO Module)

The register addresses, 386CH to 3DABH are used for checking and changing each set value belonging to the memory area.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
1	Setting memory area number	CH1 : CH64	386C : 38AB	14444 : 14507	R/W	C	1 to 8	1
2	Event 1 set value (EV1)	CH1 : CH64	38AC : 38EB	14508 : 14571	R/W	C	Deviation action, Deviation action between channels, Temperatue rise completion range: –Input span to +Input span Process action, SV action: Input scale low to Input scale high MV action: –5.0 to +105.0 %	50
3	Event 2 set value (EV2)	CH1 : CH64	38EC : 392B	14572 : 14635	R/W	C		50
4	Event 3 set value (EV3)	CH1 : CH64	392C : 396B	14636 : 14699	R/W	C		50
5	Event 4 set value (EV4)	CH1 : CH64	396C : 39AB	14700 : 14763	R/W	C		50
6	Control loop break alarm (LBA) time	CH1 : CH64	39AC : 39EB	14764 : 14827	R/W	C	0 to 7200 seconds (0: Unused)	480
7	LBA deadband	CH1 : CH64	39EC : 3A2B	14828 : 14791	R/W	C	0 (0.0) to Input span Varies with the setting of the decimal point position.	0 (0.0)
8	Set value (SV)	CH1 : CH64	3A2C : 3A6B	14892 : 14955	R/W	C	Setting limiter low to Setting limiter high	TC/RTD: 0 V/I: 0.0
9	Proportional band [heat-side]	CH1 : CH64	3A6C : 3AAB	14956 : 15019	R/W	C	inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.0 to 1000.0 % of input span 0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a Heat/Cool PID control type.)	TC/RTD: 30 (30.0) V/I: 30.0
10	Integral time [heat-side]	CH1 : CH64	3AAC : 3AEB	15020 : 15083	R/W	C	PID control or Heat/Cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Position proportioning PID control: 1 to 3600 seconds or 0.1 to 1999.9 seconds	240
11	Derivative time [heat-side]	CH1 : CH64	3AEC : 3B2B	15084 : 15147	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action)	60
12	Control response parameter	CH1 : CH64	3B2C : 3B6B	15148 : 15211	R/W	C	0: Slow 1: Medium 2: Fast When the P or PD action is selected, this setting becomes invalid.	PID control, Position proportioning PID control: 0 Heat/Cool PID control: 2

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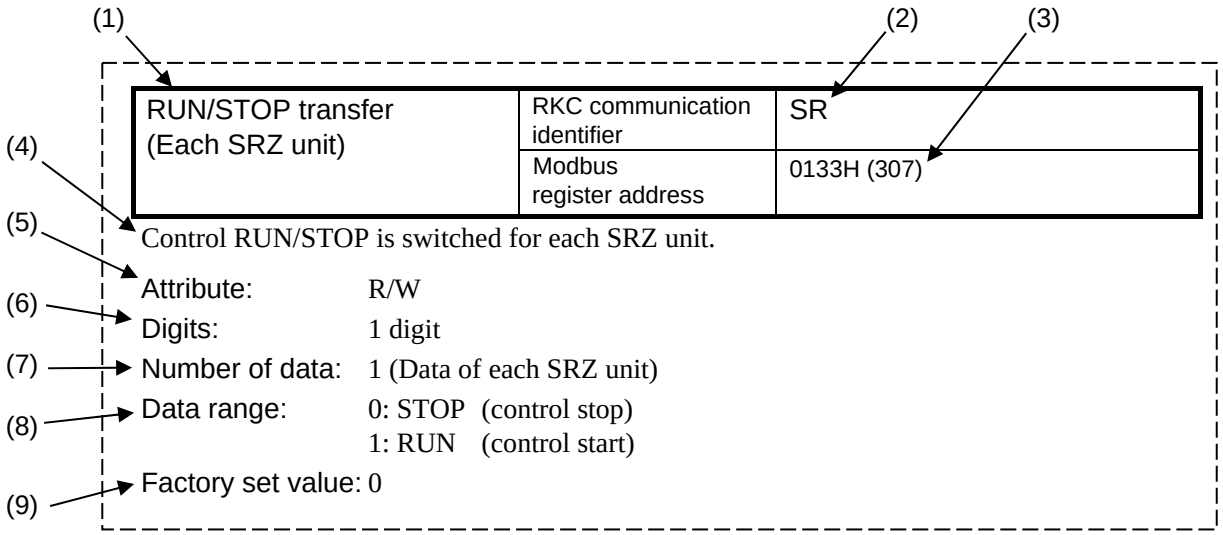
No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
13	Proportional band [cool-side]	CH1 : CH64	3B6C : 3BAB	15212 : 15275	R/W	C	TC/RTD inputs: 1 to Input span or 0.1 to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position. Voltage (V)/Current (I) inputs: 0.1 to 1000.0 % of input span	TC/RTD: 30 (30.0) V/I: 30.0
14	Integral time [cool-side]	CH1 : CH64	3BAC : 3BEB	15276 : 15339	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action)	240
15	Derivative time [cool-side]	CH1 : CH64	3BEC : 3C2B	15340 : 15403	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action)	60
16	Overlap/Deadband	CH1 : CH64	3C2C : 3C6B	15404 : 15467	R/W	C	TC/RTD inputs: –Input span to +Input span (Unit:°C [°F]) Voltage (V)/Current (I) inputs: –100.0 to +100.0 % of input span	0
17	Manual reset	CH1 : CH64	3C6C : 3CAB	15468 : 15531	R/W	C	–100.0 to +100.0 %	0.0
18	Setting change rate limiter (up)	CH1 : CH64	3CAC : 3CEB	15532 : 15595	R/W	C	0 (0.0) to Input span/unit time * 0 (0.0): Unused Varies with the setting of the decimal point position. * Unit time: 60 seconds (factory set value)	0 (0.0)
19	Setting change rate limiter (down)	CH1 : CH64	3CEC : 3D2B	15596 : 15659	R/W	C		0 (0.0)
20	Area soak time	CH1 : CH64	3D2C : 3D6B	15660 : 15723	R/W	C	0 minutes 00 seconds to 199 minutes 59 seconds: 0 to 11999 seconds 0 hours 00 minutes to 99 hours 59 minutes: 0 to 5999 minutes	0
21	Link area number	CH1 : CH64	3D6C : 3DAB	15724 : 15787	R/W	C	0 to 8 (0: No link)	0
22	Unused	—	3DAC : 3E6B	15788 : 15979	—	—	—	—

9. COMMUNICATION DATA DESCRIPTION OF Z-COM MODULE

This chapter describes details of Z-COM module data.

☞ For details of Z-TIO module and Z-DIO module communication data, refer to **SRZ Instruction Manual (IMS01T04-E□)**. For details of Z-CT module communication data, refer to **Z-CT Instruction Manual [Detailed version] (IMS01T21-E□)**.

9.1 Reference to Communication Data Contents



(1) Name: Communication data name
The PLC communication environment setting items are indicated as "system data (setting items or monitor items)."

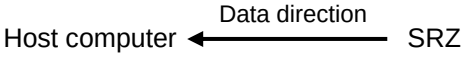
(2) RKC communication identifier:
Communication identifier of RKC communication

(3) Modbus register address:
Modbus communication data register addresses of each channel
These register addresses are written using both of hexadecimal and decimal (in parentheses) numbers.

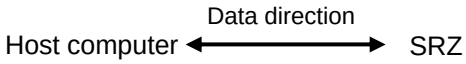
(4) Description: A short description of the communication data item

(5) Attribute: A method of how communication data items are read or written when viewed from the host computer is described.

RO: Read only data



R/W: Read and Write data



(6) Digits: The number of communication data digits in RKC communication

(7) Number of data: The number of communication data in Modbus

(8) Data range: Read or Write range of communication data

(9) Factory set value: Factory set value of communication data

📖 There is item including the functional description.

9.2 Communication Data of Z-COM Module

Model code (Z-COM module)	RKC communication identifier	ID
	Modbus register address	—

This value is the type identifier code of the Z-COM module.

Attribute: RO
Digits: 32 digits
Number of data: 1 (Data of each SRZ unit)
Data range: —
Factory set value: —

Model code (Function module)	RKC communication identifier	IE
	Modbus register address	—

This value is the type identifier code of the function modules (Z-TIO, Z-DIO and Z-CT modules) joined to the Z-COM module.

Attribute: RO
Digits: 32 digits
Number of data: 100 (Data of each module)
Data range: —
Factory set value: —

ROM version (Z-COM module)	RKC communication identifier	VR
	Modbus register address	—

This value is a version of the ROM loaded on the Z-COM module.

Attribute: RO
Digits: 8 digits
Number of data: 1 (Data of each SRZ unit)
Data range: The version of loading software
Factory set value: —

ROM version (Function module)	RKC communication identifier	VQ
	Modbus register address	—

This value is a version of the ROM on the function modules (Z-TIO, Z-DIO and Z-CT modules) joined to the Z-COM module.

Attribute: RO
Digits: 8 digits
Number of data: 100 (Data of each module)
Data range: The version of loading software
Factory set value: —

Integrated operating time monitor (Z-COM module)	RKC communication identifier	UT
	Modbus register address	—

This value is an integrated operating time of the Z-COM module.

Attribute: RO
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 19999 hours
Factory set value: —

Integrated operating time monitor (Function module)	RKC communication identifier	UV
	Modbus register address	—

This value is an integrated operating time of the function modules (Z-TIO, Z-DIO and Z-CT modules) joined to the Z-COM module.

Attribute: RO
Digits: 7 digits
Number of data: 100 (Data of each module)
Data range: 0 to 19999 hours
Factory set value: —

Error code (Z-COM module)	RKC communication identifier	ER
	Modbus register address	0000H (0)

Each error state of the SRZ unit is expressed in bit data items. For the identifier ER, the error condition is shown by the *OR* of each module.

Attribute: RO
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 127 (Bit data)
The error state is assigned as a bit image in binary numbers.
However, send data from the SRZ unit be changed to decimal ASCII code from the bit image in binary numbers for RKC communication.

Bit image: 0000000000000000

Bit 15 ····· Bit 0

Bit data: 0: OFF 1: ON

Modbus

Bit 0	SRAM error [1]/Adjustment data error [2]
Bit 1	Data back-up error [2]
Bit 2	A/D conversion error [2]
Bit 3	Unused
Bit 4	Unused
Bit 5	Logic output data error
Bit 6	Stack overflow [1]
Bit 7 to Bit 15	Unused

RKC communication (ASCII code data)

1	SRAM error [1]/Adjustment data error [2]
2	Data back-up error [2]
4	A/D conversion error [2]
32	Logic output data error
64	Stack overflow [1]

[1] These are error items only of the Z-COM module.
[2] The error code of the Z-CT module is these three types

Factory set value: —

Error code (Function module)	RKC communication identifier	EZ
	Modbus register address	ch1: 0001H (1) to ch100: 0064H (100)

Each error state of the function modules (Z-TIO, Z-DIO and Z-CT modules) joined to the Z-COM module is expressed in bit data items.

Attribute: RO

Digits: 7 digits

Number of data: 100 (Data of each module)

Data range: 0 to 63 (Bit data)
The error state is assigned as a bit image in binary numbers.
However, send data from the SRZ unit be changed to decimal ASCII code from the bit image in binary numbers for RKC communication.

Bit image: 0000000000000000

Bit 15 ····· Bit 0

Bit data: 0: OFF 1: ON

Modbus

Bit 0	Adjustment data error *
Bit 1	Data back-up error *
Bit 2	A/D conversion error *
Bit 3	Unused
Bit 4	Unused
Bit 5	Logic output data error
Bit 6 to Bit 15	Unused

RKC communication (ASCII code data)

1	Adjustment data error *
2	Data back-up error *
4	A/D conversion error *
32	Logic output data error

* The error code of the Z-CT module is these three types

Factory set value: —

Backup memory state monitor (Z-COM module)	RKC communication identifier	EM
	Modbus register address	0065H (101)

Allows the state of the contents of the RAM and backup memory (FRAM) of the Z-COM module to be checked.

Attribute: RO
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: The content of the backup memory does not coincide with that of the RAM.
1: The content of the backup memory coincides with that of the RAM.
Factory set value: —

Backup memory state monitor (Function module)	RKC communication identifier	CZ
	Modbus register address	ch1: 0066H (102) to ch100: 00C9H (201)

Allows the state of the contents of the RAM and backup memory (FRAM) of the function modules (Z-TIO, Z-DIO and Z-CT modules) joined to the Z-COM module to be checked.

Attribute: RO
Digits: 1 digit
Number of data: 100 (Data of each module)
Data range: 0: The content of the backup memory does not coincide with that of the RAM.
1: The content of the backup memory coincides with that of the RAM.
Factory set value: —

System communication state	RKC communication identifier	QM
System data (monitor items)	Modbus register address	00CAH (202)

When the power is turned on, collects data of the function modules joined to the Z-COM module. When data collection ends, the System communication state changes to "1." When System communication state becomes "1," PLC communication can be performed.

Attribute: RO
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0 or 1 (Bit data)
The error state is assigned to a bit 0 in binary numbers.

Bit image: 0000000000000000

Bit 15 ····· Bit 0

Bit data: 0: Before data collection is completed
1: Data collection is completed

Bit 0	Data collection condition
Bit 1 to Bit 15	Unused

Factory set value: —

SRZ normal communication flag	RKC communication identifier	QL
System data (monitor items)	Modbus register address	00CBH (203)

Communication verification flag. When the SRZ unit is performing communication normally, "0" and "1" are repeated for each communication period. If the SRZ unit stops communicating, the communication flag does not change.

Attribute: RO
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0/1 transfer (For communication checking)
Factory set value: —

Action of SRZ normal communication flag

- When the System communication state is "0," the System data (monitor items) are written from the SRZ unit to the PLC. The flag switches between "0" and "1" each write of System data (monitor items).
- When the System communication state is "1," "0" and "1" are repeated for each period of communication of the monitor group and setting group of PLC communication.
  The more communication data there is, the longer the communication period.
  The communication period is also longer when a request command is performed.

PLC communication error code	RKC communication identifier	ES
System data (monitor items)	Modbus register address	00CCH (204)

Indicates an error state of PLC communication by bit data.

Attribute: RO
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 31 (Bit data)
The error state is assigned as a bit image in binary numbers.

Bit image: 0000000000000000
Bit 15 ····· Bit 0

Bit data: 0: OFF 1: ON

Bit 0	PLC register read/write error
Bit 1	Slave communication timeout
Bit 2	Unused
Bit 3	Internal communication error
Bit 4	Master communication timeout
Bit 1 to Bit 15	Unused

Factory set value: —

Error code type

- PLC register read/write error

  Turns ON when it is not possible to read from or write to the PLC register.
  Three seconds after the normal communication state is restored, this turns OFF.

- Slave communication timeout

  To be turned on when communication with slave units is timed out during communication with the PLC with SRZ units multi-drop connected.
  If the slave unit detects the timeout, data send to the PLC stops to be set to the standby state.
  Communication re-starts after data send re-opens from the master unit.
  In addition, if the master unit detects the timeout, data re-send starts.

- Internal communication error

  This turns ON when an internal communication error occurs in the SRZ unit.

- Master communication timeout

  This turns ON when a timeout occurs during communication between the PLC and the master unit.

Unit recognition flag	RKC communication identifier	QN
System data (monitor items)	Modbus register address	00CDH (205)

Indicates the connection state of the SRZ unit. A slave unit (other than a master unit with unit address 0, 4, 8, C) can only recognize its own state.

Attribute: RO
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 15 (Bit data)
The unit recognition flag state is assigned as a bit image in binary numbers.

Bit image: 0000000000000000
Bit 15 ····· Bit 0

Bit data: 0: No unit exists
1: Unit exists

Bit 0	SRZ unit 1
Bit 1	SRZ unit 2
Bit 2	SRZ unit 3
Bit 3	SRZ unit 4
Bit 4 to Bit 15	Unused

Factory set value: —

Monitor for the number of connected modules	RKC communication identifier	QK
Syetem data (monitor items)	Modbus register address	0132H (306)

This value is the number of the function module joined to the Z-COM module.

Attribute: RO
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 31
Factory set value: —

RUN/STOP transfer (Each SRZ unit)	RKC communication identifier	SR
	Modbus register address	0133H (307)

Control RUN (control start)/STOP (control stop) is transferred for each SRZ unit.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: STOP (control stop)
1: RUN (control start)
Factory set value: 0

When RUN/STOP transfer (Each SRZ unit) becomes STOP (control stop), the set lock (Identifier: LK, Resister address: 5E0CH to 5E1BH) of the Z-CT module becomes "0: Unlock."

RUN/STOP transfer (Each module)	RKC communication identifier	SW
	Modbus register address	ch1: 0134H (308) to ch100: 0197H (407)

Control RUN (control start)/STOP (control stop) is transferred for each module.

Attribute: R/W
Digits: 1 digit
Number of data: 100 (Data of each module)
Data range: 0: STOP (control stop)
1: RUN (control start)
Factory set value: 0

This item does not support a Z-CT module.

Control RUN/STOP holding setting	RKC communication identifier	X1
	Modbus register address	ch1: 0198H (408) to ch100: 01BFH (507)

It is set whether or not the operation mode before the power supply is turned off is held when the power supply is turned on or power failure recovers.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each module)
Data range: 0: Not holding (STOP start)
1: Holding (RUN/STOP hold)
Factory set value: 1

When "0: Not holding (STOP mode)" is selected, the action at restoration of power will be as follows.

	Operation mode when power failure recovers	Output value when power failure recovers
STOP mode	Started in the control stop (STOP) state regardless of the RUN mode before power failure. [1]	Manipulated output value at STOP mode [2]

[1] If changed to RUN from STOP by RUN/STOP selection after start, set to the operation mode before power failure occurs.

[2] For Position proportioning PID control (no feedback resistance input), the action will be the same as the "Valve action at STOP" setting.

This item does not support a Z-CT module.

For the following data, the power must be turned off and then on, or control must be changed from STOP to RUN, in order for the settings to take effect.

Communication 1 protocol	RKC communication identifier	VK
	Modbus register address	8000H (32768)

Use to set a protocol of communication 1 (COM. PORT 1, COM. PORT 2) via Host communication or Loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: RKC communication
1: Modbus
Factory set value: 0

Communication 1 communication speed	RKC communication identifier	VL
	Modbus register address	8001H (32769)

Use to set a Communication speed of communication 1 (COM. PORT 1, COM. PORT 2) via Host communication or Loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: 4800 bps
1: 9600 bps
2: 19200 bps
3: 38400 bps
Factory set value: 2

Communication 1 data bit configuration	RKC communication identifier	VM
	Modbus register address	8002H (32770)

Use to set a Data bit configuration of communication 1 (COM. PORT 1, COM. PORT 2) via Host communication or Loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 5

Set value	Data bit	Parity bit	Stop bit	Settable communication
0	8	Without	1	Modbus RKC communication PLC communication
1	8	Even	1	
2	8	Odd	1	
3	7	Without	1	RKC communication PLC communication
4	7	Even	1	
5	7	Odd	1	

Factory set value: 0

Communication 1 interval time	RKC communication identifier	VN
	Modbus register address	8003H (32771)

Use to set an interval time of communication 1 (COM. PORT 1, COM. PORT 2) via Host communication or Loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 250 ms
Factory set value: 10

Communication 2 protocol	RKC communication identifier	VP
	Modbus register address	8004H (32772)

Use to set a protocol of communication 2 (COM. PORT 3, COM. PORT 4) via Host communication or Loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range:
0: RKC communication
1: Modbus
2: MITSUBISHI MELSEC series special protocol
A-compatible 1C frame (format 4), AnA/AnUCPU common command (QR/QW)
[AnA, AnU, QnA, Q, FX3U or FX3UC series]
QnA-compatible 3C frame (format 4), command (0401/1401)
The available register is only a ZR register. [QnA or Q series]
3: OMRON SYSMAC series special protocol
C mode command (RD/WD, RE/WE)
4: MITSUBISHI MELSEC series special protocol
A-compatible 1C frame (format 4), ACPU common command (WR/WW)
[A, FX2N, FX2NC, FX3U or FX3UC series]
5: YOKOGAWA FA-M3R special protocol
Command: WRD/WWR
Factory set value: 0

Communication 2 communication speed	RKC communication identifier	VU
	Modbus register address	8005H (32773))

Use to set a Communication speed of communication 2 (COM. PORT 3, COM. PORT 4) via Host communication or Loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range:
0: 4800 bps
1: 9600 bps
2: 19200 bps
3: 38400 bps
Factory set value: 2

Communication 2 data bit configuration	RKC communication identifier	VW
	Modbus register address	8006H (32774)

Use to set a Data bit configuration of communication 2 (COM. PORT 3, COM. PORT 4) via Host communication or Loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 11

Set value	Data bit	Parity bit	Stop bit	Settable communication
0	8	Without	1	Modbus RKC communication PLC communication
1	8	Even	1	
2	8	Odd	1	
3	7	Without	1	RKC communication PLC communication
4	7	Even	1	
5	7	Odd	1	
6	8	Without	2	PLC communication
7	8	Even	2	
8	8	Odd	2	
9	7	Without	2	
10	7	Even	2	
11	7	Odd	2	

Factory set value: 0

Communication 2 interval time	RKC communication identifier	VX
	Modbus register address	8007H (32775)

Use to set an interval time of communication 2 (COM. PORT 3, COM. PORT 4) via Host communication or Loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 250ms
Factory set value: 10

Station number System data (setting items)	RKC communication identifier	QV
	Modbus register address	8008H (32776)

Set the PLC station number. Set it to the same number as the PLC.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 31 (MITSUBISHI MELSEC series, OMRON SYSMAC series)
1 to 31 (YOKOGAWA FA-M3R)
Factory set value: 0 (MITSUBISHI MELSEC series, OMRON SYSMAC series)
1 (YOKOGAWA FA-M3R)

PC number (CPU number)	RKC communication identifier	QW
System data (setting items)	Modbus register address	8009H (32777)

Set the PLC PC number (CPU number). Set it to the same number as the PLC.
(OMRON SYSMAC series: Unused)

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 255 (MITSUBISHI MELSEC series)
1 to 4 (YOKOGAWA FA-M3R)
Factory set value: 255 (MITSUBISHI MELSEC series)
1 (YOKOGAWA FA-M3R)

Register type	RKC communication identifier	QZ
System data (setting items)	Modbus register address	800AH (32778)

Set the register types used in PLC communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range:

MITSUBISHI MELSEC series	
Set value	Register type
0	D register (Data register)
1	R register (File register)
2	W register (Link register)
3	ZR register (Method of specifying consecutive numbers when 32767 of R register is exceeded.) Only enabled when the “QnA-compatible 3C frame (format 4)” is used.
4 to 29	Unused

OMRON SYSMAC series	
Set value	Register type
0	DM register (Data memory)
1 to 9	Unused
10 to 22	EM register (Extended data memory) Specify the bank No. (Set the bank No.+10.)
23 to 28	Unused
29	EM register (Extended data memory) Specify the current bank

YOKOGAWA FA-M3R	
Set value	Register type
0	D register (Data register)
1	R register (Shared register)
2	W register (link register)
3	Unused
4	B register (file register)
5 to 29	Unused

Factory set value: 0

Usable register ranges and types vary depending on used CPU types. For register ranges and types that can actually be used, refer to the PLC instruction manual.

Register start number (High-order 4-bit)	RKC communication identifier	QS
System data (setting items)	Modbus register address	800BH (32779)

Set the start number of the register used in PLC communication. Set this if the register address 65535 is exceeded in the ZR register.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 15
Factory set value: 0

Usable register ranges and types vary depending on used CPU types. For register ranges and types that can actually be used, refer to the PLC instruction manual.

Register start number (Low-order 16-bit)	RKC communication identifier	QX
System data (setting items)	Modbus register address	800CH (32780)

Set the start number of the register used in PLC communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 9999
MITSUBISHI MELSEC series [A-compatible 1C frame (format 4) ACPU common command (WR/WW)] and OMRON SYSMAC series
If a value higher than 9999 is set, a “PLC register read/write error” will result. (excluding the W register)

0 to 65535
MITSUBISHI MELSEC series [A-compatible 1C frame (format 4) AnA/AnUCPU common command (QR/QW), QnA-compatible 3C frame (format 4) command (0401/1401)] and YOKOGAWA FA-M3R

Factory set value: 1000

Usable register ranges and types vary depending on used CPU types. For register ranges and types that can actually be used, refer to the PLC instruction manual.

System data address bias	RKC communication identifier	QQ
System data (setting items)	Modbus register address	800DH (32781)

When the SRZ unit is connected in a multi-drop connection, a bias is set for the register addresses of each unit so that no address duplication occurs.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 65535
Factory set value: 2100

Usable register ranges and types vary depending on used CPU types. For register ranges and types that can actually be used, refer to the PLC instruction manual.

COM module link recognition time	RKC communication identifier	QT
System data (setting items)	Modbus register address	800EH (32782)

When connecting two or more SRZ units, set the time required until a unit after the second module is recognized. Set this item to the master unit.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 255 seconds
Factory set value: 10

PLC scanning time	RKC communication identifier	VT
System data (setting items)	Modbus register address	800FH (32783)

Set the time of waiting for a response from the PLC.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 3000 ms
Factory set value: 255

Usually, no factory set values are necessary to be changed.

PLC communication start time	RKC communication identifier	R5
System data (setting items)	Modbus register address	8010H (32784)

Time until communication with the PLC starts is set after the power is turned on.
The PLC communication start time is the time that writing of the System data (monitor items) starts. Actual communication with the PLC by Request command can only take place after the System communication state (D01000) changes to "1."

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 1 to 255 seconds
Factory set value: 5

Method for setting the number of connected modules	RKC communication identifier	RY
	Modbus register address	8011H (32785)

The Z-COM module calculates the number of channels of communication data during RKC communication, and thus the maximum module address of each function module is set in the Number of connected modules (identifier: QY, QU, QO). Select the setting method for this operation.
The maximum module address set in the Number of connected modules (identifier QY, QU, QO) will be the maximum value of the address setting switch + 1.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range:
0: No action
Automatic setting in the Number of connected modules (identifier QY, QU, QO) is not performed. (It is possible to manually set the maximum module address of the function module.)
1: Automatically set the maximum number of connected function modules only when power is turned on.
When the power is turned on, the maximum module address of the function module is automatically set in Number of connected modules (identifier QY, QU, QO).
2: Execute automatic setting of the maximum number of connected function modules.
When the number of connected modules is changed, the maximum module address of the function modules is automatically set in the Number of connected modules (identifier QY, QU, QO).
Factory set value: 1

Slave mapping method	RKC communication identifier	RK
System data (setting items)	Modbus register address	8012H (32786)

When the SRZ unit is connected in a multi-drop connection, this setting determines whether or not the bias set in System data address bias is applied to register addresses.
When the bias is enabled, a register address is calculated as shown below.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0: Bias from the address setting switch
1: Bias disabled
Factory set value: 0

When the bias is enabled, a register address is calculated as shown below.

Register address when bias is enabled =
Register address + (Address setting switch coefficient * × System data address bias)

Register address when bias is disabled

Address setting switch	
Coefficient	Set value
0	0, 4, 8, C
1	1, 5, 9, D
2	2, 6, A, E
3	3, 7, B, F

Factory set value: 2100

* In the **Z-COM Host Communication Quick Instruction Manual (IMR01T09-E□)**, this is "Remainder of set value of address setting switch/4." The result is the same in either case.

Number of connected modules (Z-TIO module)	RKC communication identifier	QY
	Modbus register address	8013H (32787)

This is the maximum address of Z-TIO modules joined to the Z-COM module. The setting method can be selected using Method for setting the number of connected modules (identifier RY).
The maximum module address that is set will be the maximum value + 1 of the address setting switch of the Z-TIO module.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 16
Factory set value: —

Number of connected modules (Z-DIO module)	RKC communication identifier	QU
	Modbus register address	8014H (32788)

This is the maximum address of Z-DIO modules joined to the Z-COM module. The setting method can be selected using Method for setting the number of connected modules (identifier RY).
The maximum module address that is set will be the maximum value + 1 of the address setting switch of the Z-DIO module.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 16
Factory set value: —

Number of connected modules (Z-CT module)	RKC communication identifier	QO
	Modbus register address	8015H (32789)

This is the maximum address of Z-CT modules joined to the Z-COM module. The setting method can be selected using Method for setting the number of connected modules (identifier RY).
The maximum module address that is set will be the maximum value + 1 of the address setting switch of the Z-CT module.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 16
Factory set value: —

Number of valid groups	RKC communication identifier	QA
	Modbus register address	801AH (32794)

This shows the number of groups split on the PLC communication data map that are valid for the SRZ unit.

Attribute: RO
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 128
Factory set value: —

Groups are edited and added using the Zeal2 PLC register mapping software tool. When PLC register addresses that were edited in Zeal2 are downloaded to the SRZ, a data check is executed. If there is an error in a group, that group and all following groups are invalid.
For example, when there are 10 split groups and the 7th group has an error, the number of valid groups will be "6."

Zeal2 can be downloaded from the official RKC website:
http://www.rkcinst.com/

There are two groups by factory default: the monitor group and the setting group.

For groups, refer to **Z-COM Instruction Manual (IMS01T22-E□)** or Help of Zeal2.

Control RUN/STOP holding setting (Each unit)	RKC communication identifier	X2
	Modbus register address	801BH (32795)

It is set whether or not the operation mode before the power supply is turned off is held when the power supply is turned on or power failure recovers.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each unit)
Data range: 0: Not holding (STOP start)
1: Holding (RUN/STOP hold)
Factory set value: 1

When "0: Not holding (STOP mode)" is selected, the action at restoration of power will be as follows.

	Operation mode when power failure recovers	Output value when power failure recovers
STOP mode	Started in the control stop (STOP) state regardless of the RUN mode before power failure. [1]	Manipulated output value at STOP mode [2]

[1] If changed to RUN from STOP by RUN/STOP selection after start, set to the operation mode before power failure occurs.
[2] For Position proportioning PID control (no feedback resistance input), the action will be the same as the "Valve action at STOP" setting.

APPENDIX

A.1 Parameters to Be Unused by Setting Change

When changing the parameters below, the related parameters are automatically set to unused.
The attribute for the unused parameters is RO (Read only) and the read data is 0.

■ When setting Control action of Z-TIO module to an action other than "5: Brilliant II Position proportioning PID control" (Identifier: XE, First address: 252CH)

Name	RKC communication		Modbus
	Identifier	Digits	First address
Open/Close output neutral zone	V2	7	2FECH
Action at feedback resistance (FBR) input error	SY	1	302CH
Feedback adjustment	FV	1	306CH
Control motor time	TN	7	30ACH
Integrated output limiter	OI	7	30ECH
Valve action at STOP	VS	1	312CH

■ When setting Event 1 type of Z-TIO module to "0: None" (Identifier: XA, First address: 1C2CH)

Name	RKC communication		Modbus
	Identifier	Digits	First address
Event 1 set value (EV1)	A1	7	095CH

■ When setting Event 2 type of Z-TIO module to "0: None" (Identifier: XB, First address: 1DECH)

Name	RKC communication		Modbus
	Identifier	Digits	First address
Event 2 set value (EV2)	A2	7	099CH

■ When setting Event 3 type of Z-TIO module to "0: None" (Identifier: XC, First address: 1FACH)

Name	RKC communication		Modbus
	Identifier	Digits	First address
Event 3 set value (EV3)	A3	7	09DCH

■ **When setting Event 4 type of Z-TIO module to "0: None" (Identifier: XD, First address: 216CH)**

Name	RKC communication		Modbus
	Identifier	Digits	First address
Event 4 set value (EV4)	A4	7	0A1CH

■ **When setting Operation mode of Z-TIO module to "0: Unused" (Identifier: EI, First address: 161CH)**

Name	RKC communication		Modbus
	Identifier	Digits	First address
Measured value (PV)	M1	7	01FCH
Comprehensive event state	AJ	7	023CH
Manipulated output value (MV) monitor [heat-side]	O1	7	02CCH
Manipulated output value (MV) monitor [cool-side]	O2	7	030CH
Operation mode state monitor	L0	7	027CH
Set value (SV) monitor	MS	7	038CH
Remote setting (RS) input value monitor	S2	7	03CCH
Burnout state monitor	B1	1	040CH
Memory area soak time monitor	TR	7	059CH

A.2 Parameters to Be Unused Are Based on the Model Code at Ordering

Based on the model code specified at ordering, the related parameters below are automatically set to unused. The attribute for the unused parameters is RO (Read only) and the read data is 0.

■ **When Current transformer (CT) input is specified with "N: None" at the model code of the Z-TIO module**

Name	RKC communication		Modbus
	Identifier	Digits	First address
Current transformer (CT) input value monitor	M3	7	034CH
Heater break alarm (HBA) set value	A7	7	0E5CH
Heater break determination point	NE	7	0E9CH
Heater melting determination point	NF	7	0EDCH
CT ratio	XS	7	232CH
CT assignment	ZF	1	236CH
Heater break alarm (HBA) type	ND	1	23ACH
Number of heater break alarm (HBA) delay times	DH	7	23ECH

■ When Digital input (DI) is specified with "N: None" at the model code of the Z-DIO module

Name	RKC communication		Modbus
	Identifier	Digits	First address
Digital input (DI) state 1	L1	7	3E6CH
DI function assignment	H2	7	433CH
Memory area setting signal	E1	1	434CH

■ When Digital output (DO) is specified with "N: None" at the model code of the Z-DIO module

Name	RKC communication		Modbus
	Identifier	Digits	First address
Digital output (DO) state 1	Q2	7	3E7CH
DO manual output 1	Q4	7	3FDCH
DO output distribution selection	DO	1	3FECH
DO output distribution bias	O8	7	406CH
DO output distribution ratio	O9	7	40ECH
DO proportional cycle time	V0	7	416CH
DO minimum ON/OFF time of proportioning cycle	VJ	7	41ECH
DO signal assignment module address 1 [DO1 to DO4]	LQ	7	435CH
DO signal assignment module address 2 [DO5 to DO8]	LR	7	436CH
DO output assignment 1 [DO1 to DO4]	LT	7	437CH
DO output assignment 2 [DO5 to DO8]	LX	7	438CH
DO Energized/De-energized	NB	1	439CH
DO output distribution master channel module address	DD	7	441CH
DO output distribution master channel selection	DJ	7	449CH
DO manipulated output value (MV) at STOP mode	OJ	7	451CH
DO output limiter (high)	D3	7	459CH
DO output limiter (low)	D4	7	461CH

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RKC INSTRUMENT INC.

HEADQUARTERS: 16-6, KUGAHARA 5-CHOME, OHTA-KU TOKYO 146-8515 JAPAN
PHONE: 03-3751-9799 (+81 3 3751 9799)
E-mail: info@rkcinst.co.jp
Website: http://www.rkcinst.com/

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